Intel Core 2 Extreme QX6700 | Pioneer BDR-101A | ATI Radeon X1650 XT

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COMPUTER POWER USER

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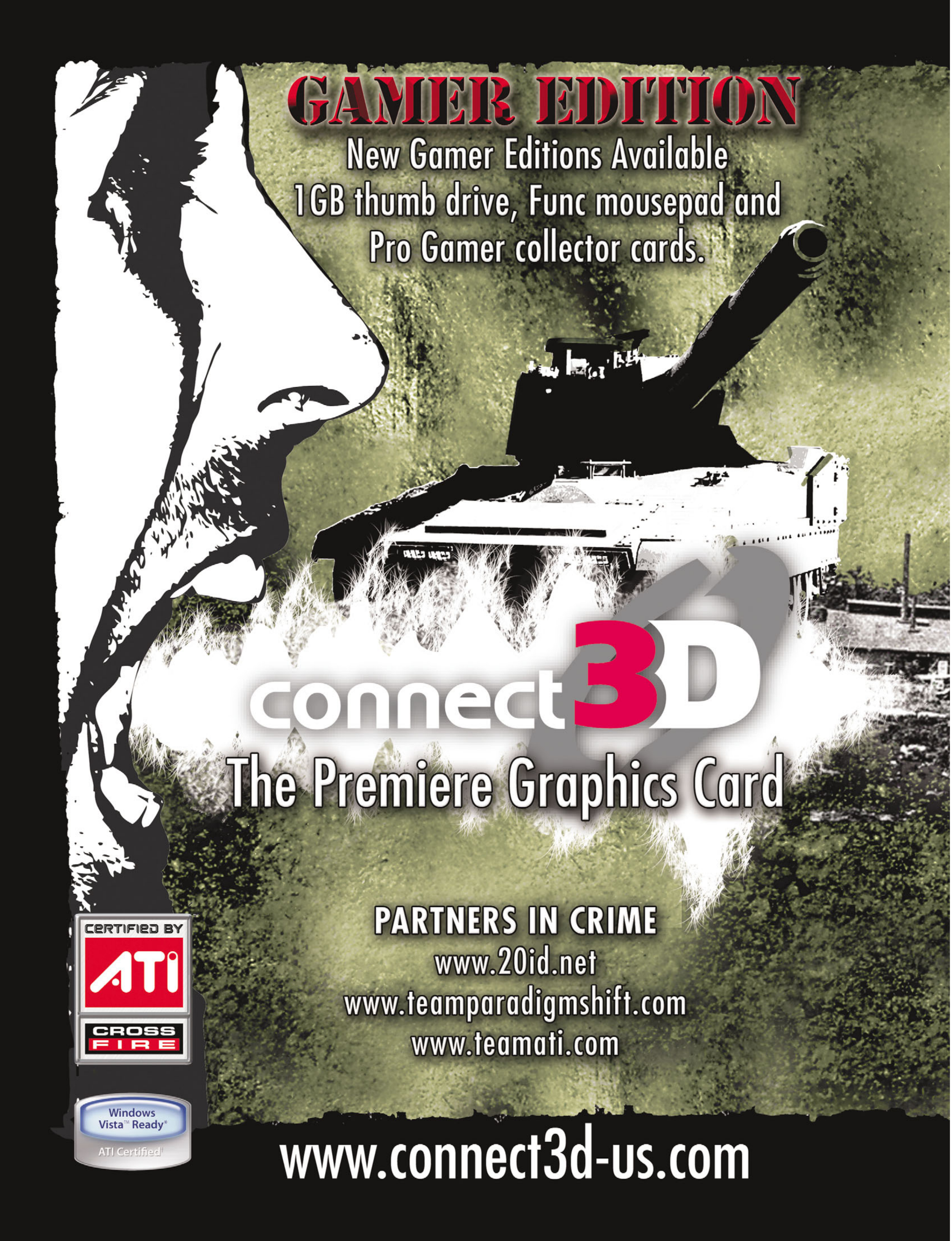

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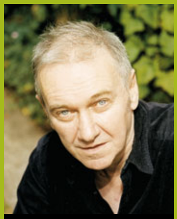
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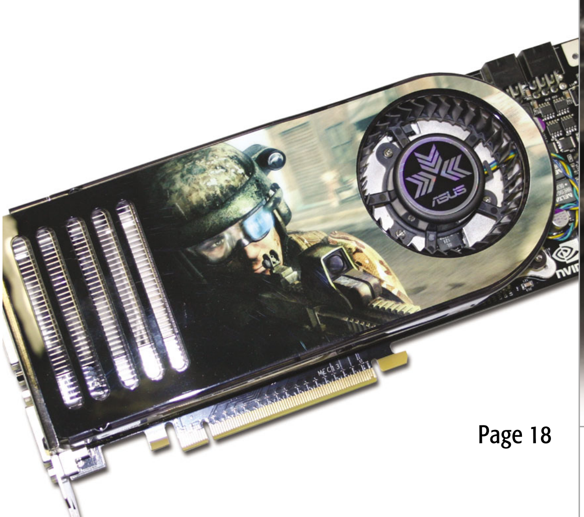

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CORRECTIONS:

On page 30 of the December issue, we incorrectly printed in the text of our Cyberpower Gamer Infinity SLI KO that the system produced a 3DMark06 score of 1551. The system scored 15551, as stated in the chart.

On page 69 of the December issue, Realtek's URL should read: www.realtek.com.tw.

Our tests of the Asus P5NSLI on page 28 of the December issue were performed using a Core 2 Duo X6800, not an E6700.

Other than that (and some calculation errors in "The Saint" which have been fixed online), the issue was flawless.

Infinite Loops

Strange stats and other oddball items from computing's periphery

86, 97, 99

EDITOR'S NOTE

Happy New Year!

(OK, if you're a subscriber or you bought this issue at the newsstand the day it hit the shelf, it's not officially 2007 yet, but you get the idea.)

This year will be another big one for PC Tech, and we're looking forward to bringing you the highlights every step of the way. We have some fun stuff planned for 2007, including the likely return of an old, favorite feature or two (more on that as details are available) and some new things here and there, as well.

In the meantime, head to page 50 and enjoy our look at which components, peripherals, and programs were the best this past year (as well as some quick-hit thoughts on which items in these categories were the most disappointing) and a tip or three on what to keep an eye on in the coming months. Some of the choices we had to make were tougher than others, to be sure, but agree or disagree we think you'll enjoy sifting through these. And by the way, if you disagree with our picks, stop by the forums at www.computerpoweruser.com and let us know which items you'd have picked and why.

Also this month, check out our comparative roundups of the first few GeForce 8800 GTX and 8800 GTS video cards to hit the market, our full review of the quad-core Core 2 Extreme QX6700, and a step-by-step guide to boosting your broadband cable signal.

Now if you'll excuse me, I have to get to work on the next issue. Or, maybe I'll take an early lunch and dive back into our Game of the Month; those Locust jerks aren't gonna frag themselves.

Chris Trumble, Publication Editor, *CPU*

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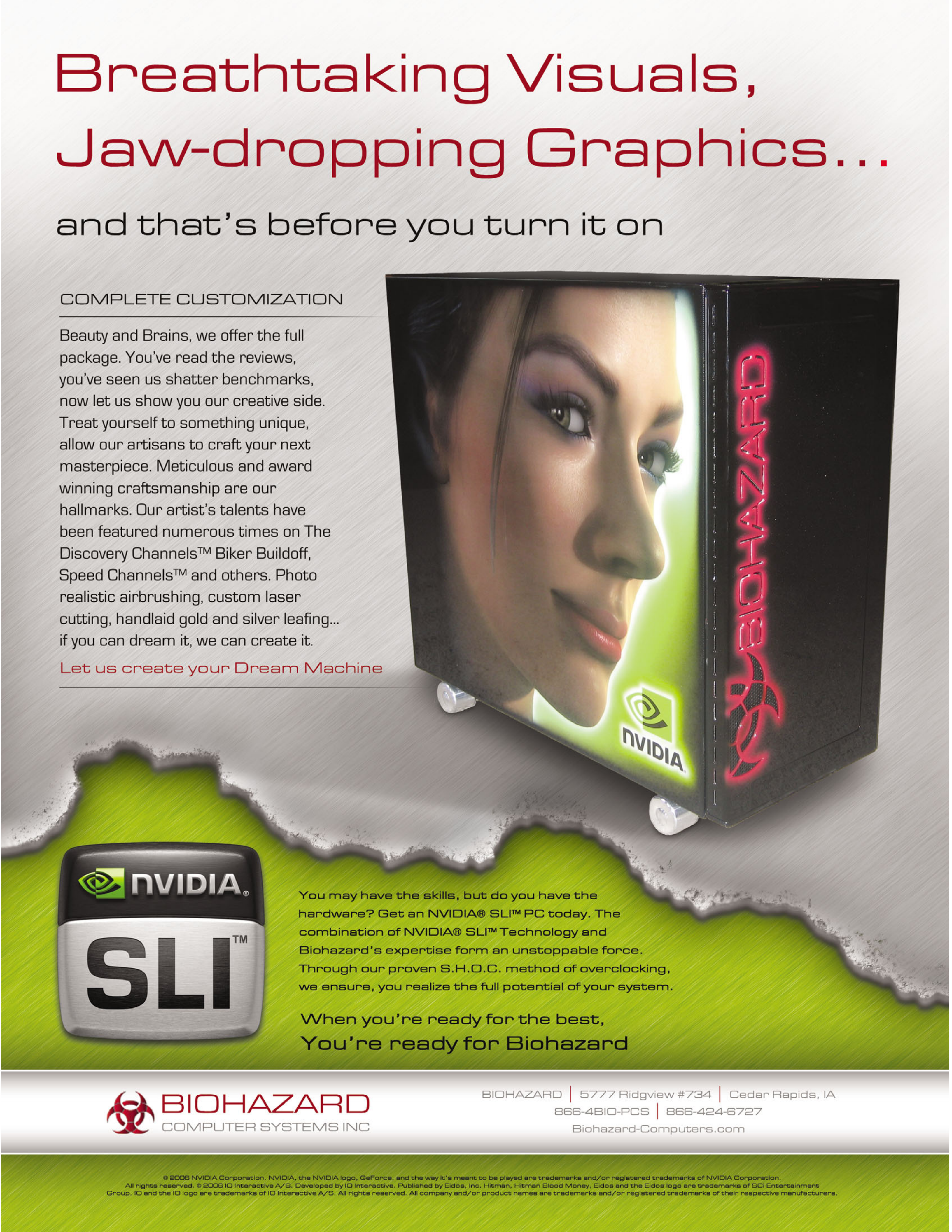

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What's Happening • Hardware

Compiled by Steve Smith

BenQ Feeds The Widescreen With A Fat Pipe

The line between desktop PCs and home theaters gets hazier by the day, and in late 2006 BenQ did its part for convergence with the $1,099 FP241W multifunction LCD. BenQ says this widescreen, 24-inch monitor is the first display of its size to accept HDMI input, the standard for connecting with hi-def devices such as HD DVD, HDTV tuners, and the new PlayStation 3 game console. The FP241W has full HD support, but it's also a snazzy Windows monitor, with a 1,920 x 1,200 native resolution, 1,000:1 contrast ratio, and very low response times. In addition to HDMI, of course, it handles a range of standard inputs for those of us still slumming with DVD-D cables. ▲

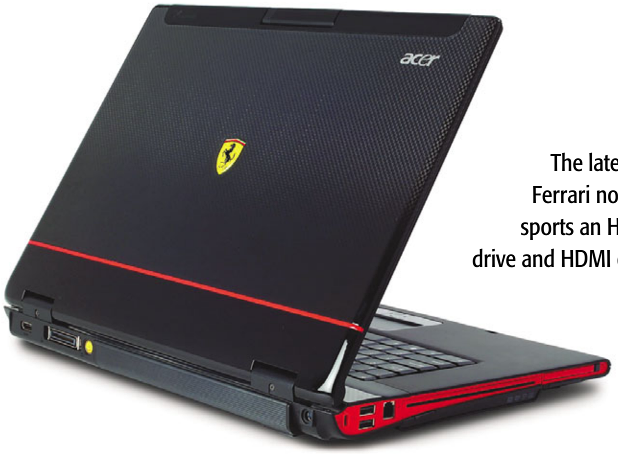
Antec Nine Hundred Lets In The Air

When hard core isn't enough, try Antec's new "extreme hard-core" Nine Hundred cases. Designed specifically to cast off the blistering heat from high-end, highly overclocked custom PC builds, the case's perforated front bezel is only the beginning of your airflow's journey. A top-mounted 200mm TriCool exhaust fan sucks the heat out, while (are you ready?) three more 120mm TriCool units cool the hard drives and interior, with the option to add two more fans for the graphics card. But we're just as thrilled that Antec put USB 2.0, FireWire, and audio connectors at the top of the box and provided a tray for our MP3 player because we're really tired of getting rug burn by hooking things up to the back of our computer. ▲

With a top-mounted 200mm exhaust fan, Antec's Nine Hundred case really sucks—air, that is.

Acer Revs It Up

If that tricked-out ThinkPad notebook just doesn't impress anyone anymore in first class, then gentlemen, start your Acer Ferrari 5000 notebook engines. The glossy case (don't forget the matching Ferrari mouse) actually has some unique performance chops under the hood. An AMD Turion 64 dual-core CPU drives the notebook, and the integrated Web cam above the 15.4-inch widescreen and an Acer VoIP Bluetooth phone should make conferencing and video calls a snap. Plus, there's HD DVD support with HDMI output, which is going to make your version of "King Kong" look so much better than that low-res dreck the poor CEO next to you is watching. The Ferrari 5000? About $2,400. Making the Armani-clad junior executive in seat 3B green with envy? Priceless. ▲



The latest Acer Ferrari notebook sports an HD DVD drive and HDMI output.

Your Grandfather's Hip PC?

With its Midwestern hospitality and charming cow-like box, we often recommended Gateway as a user-friendly source of PCs—for our parents to buy. With its high-end FX530 line of gaming PCs, it now wants a piece of VoodooPC and Alienware's action. The new FX stylings house custom builds that run up to $5,000 for Core 2 Extreme CPUs, 24-inch widescreen LCD, CrossFire video, and 1.5TB storage in a RAID array. That should tip over a few cows. ▲

Cool cow, man! Gateway's $5,000 gaming rig.

Hardware Mole

Hitachi: 750GB Laptops In Three Years

Get ready for monster laptops as drive manufacturer Hitachi predicts that 750GB notebook storage will be common by 2010. The company just shipped its millionth Travelstar drive using the new, more compact PMR (perpendicular magnetic recording) scheme. Hitachi plans to introduce 200GB and 250GB drives using PMR to the portable market in 2007, but this technology has proven so reliable and scaled so quickly to high-volume production that the company says it expects enormous capacity gains very soon. ▲

The Phantom Materializes Among Aliens

Once promised as a broadband-fueled game device for the living room, the Phantom still hasn't made it to market, but the keyboard has. Offering it as an option in its Media Center line of PCs, Alienware has put in an order for the Phantom Wireless Lapboard (www.phantom.net; $129.95). The novel design can angle up 22 degrees and rotate 360 degrees for easy manageability from a couch. As for the original Phantom gaming service itself? Still as mysterious and invisible as a, well, you know. . . . ▲

N To The Xtreme

Even routers are all "extreme" now. (See "Antec Nine Hundred Lets In The Air" on page 6.) Anyone who has tried to stream video wirelessly upstairs while someone on the downstairs notebook downloads a hefty torrent knows that the modern digital family now argues over bandwidth, not bathrooms. D-Link says it has an answer. Its new Xtreme N Gigabit routers and adapters use intelligent QoS technology that prioritizes high-bandwidth, latency-sensitive traffic such as streaming video, VoIP, and online gaming. Will it work? Will it bring peace to wireless homes everywhere? It will cost you $199.99 for the router and $119.99 for the notebook adapter to find out. ▲

D-Link's new Xtreme N line of draft-N routers promises better traffic prioritizing to handle the multimedia streams now coursing through home networks.

Compiled by Dean Takahashi

Micron's Chips Help Bring Off-Road Baja Race To The 'Net

Steve Appleton, the CEO of Micron Technology, is a stunt pilot in his spare time. So it's no wonder that the hard-charging CEO got his executives to join him in one of the world's most grueling off-road races, the Tecate SCORE Baja 1000. The race goes through rough terrain from Ensenada to La Paz, Baja California, Mexico. The Micron team outfitted their off-road vehicles with digital camcorders, DigitalClarity image sensors, and Lexar CompactFlash memory cards so they could transmit images from the race via satellite to viewers on the Internet. Micron, with its newly acquired Lexar division, is a leader in both imaging sensors for cameras and flash memory for storing images. The company sponsored four vehicles in the off-road race: Appleton himself drove one of the vehicles. He says that the race is a team-building exercise and does not "view it as life-threatening." ▲

Noise-Cancellation Chips Could Take The Static Out Of Cell Phone Calls

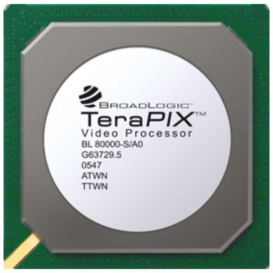
With radio and electrical interference a big problem for today's cell phones, getting good reception can be a nightmare. Quellan hopes to solve this problem with its Q:Active technology. The technology maps the characteristics of any electrical or radio signal and then mathematically cancels the noise that erodes the clarity of the signal. Tony Stelliga, CEO of Quellan, says that tiny analog chips can restore several bars of cell phone reception, making dropped calls a thing of the past in many regions. On top of cell phones, Quellan sees opportunities in a variety of markets, including data centers, where eliminating noise can reduce the cost of cables. ▲

Watching The Chips Fall

Here is pricing information for AMD and Intel CPUs.

*Retail price
** Manufacturer's price per 1,000 units
Other current prices, if indicated, are lowest OEM prices available through Pricegrabber.com

CPU	Released	Original price	Last month's price	Current price
AMD Athlon 64 FX-62	5/23/2006	$1,031**	$674	$664
AMD Athlon 64 X2 Dual-Core 4200+ energy efficient	5/16/2006	$417**	$183	$187
AMD Athlon 64 X2 Dual-Core 4200+ AM2 or 939	5/31/2005	$537**	$215	$187
AMD Athlon 64 X2 Dual-Core 4400+ energy efficient	5/16/2006	$514**	$487	$234
AMD Athlon 64 X2 Dual-Core 4400+ AM2 or 939	5/31/2005	$581**	$226	$234
AMD Athlon 64 X2 Dual-Core 4600+ energy efficient	5/16/2006	$601**	$235	$249
AMD Athlon 64 X2 Dual-Core 4600+ AM2 only	5/31/2005	$803**	$235	$249
AMD Athlon 64 X2 Dual-Core 4800+ energy efficient	5/16/2006	$671**	$670	$344
AMD Athlon 64 X2 Dual-Core 5000+ AM2 only	5/23/2006	$696**	$471	$320
AMD Athlon 64 X2 Dual-Core 5200+ AM2 only	9/6/2006	$827**	$599	$419
Intel Pentium Processor Extreme Edition 955 3.46GHz dual-core	12/27/2005	$999**	$749	$868
Intel Pentium Processor Extreme Edition 965 3.73GHz dual-core	3/22/2006	$999**	$975	$975
Intel Pentium 4 651 3.4GHz 2MB cache 800MHz FSB 65nm	12/27/2005	$273**	$180	$209
Intel Pentium 4 661 3.6GHz 2MB cache 800MHz FSB 65nm	12/27/2005	$401**	$192	$196
Intel Pentium 4 670 3.8GHz 2MB cache 800MHz FSB 90nm	5/26/2005	$849**	$632	$639
Intel Pentium D 920 2.8GHz dual-core 2MB 800MHz FSB 65nm	12/27/2005	$241**	$165	$140
Intel Pentium D 930 3GHz dual-core 2MB 800MHz FSB 65nm	12/27/2005	$316**	$156	$154
Intel Pentium D 940 3.2GHz dual-core 2MB 800MHz FSB 65nm	12/27/2005	$423**	$188	$192
Intel Pentium D 950 3.4GHz dual-core 2MB 800MHz FSB 65nm	12/27/2005	$637**	$215	$225
Intel Pentium D 960 3.6GHz dual-core 2MB 800MHz FSB 65nm	5/1/2006	$530**	$319	$334
Intel Core 2 Duo E6300 1.86GHz 2MB cache 1,066MHz FSB 65nm	7/27/2006	$183**	$179	$182
Intel Core 2 Duo E6400 2.13GHz 2MB cache 1,066MHz FSB 65nm	7/27/2006	$224**	$219	$219
Intel Core 2 Duo E6600 2.4GHz 4MB cache 1,066MHz FSB 65nm	7/27/2006	$316**	$313	$309
Intel Core 2 Duo E6700 2.66GHz 4MB cache 1,066MHz FSB 65nm	7/27/2006	$530**	$494	$489
Intel Core 2 Duo X6800 2.93GHz 4MB cache 1,066MHz FSB 65nm	7/27/2006	$999**	$910	$910

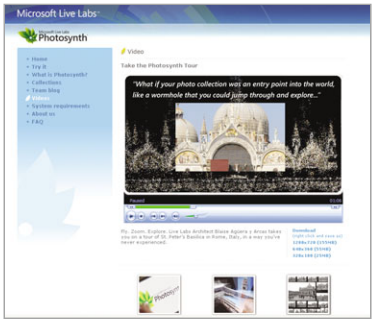


Startup Tips The Balance Toward Cable Companies In Telco War

Cable TV companies spend more than $95 billion upgrading their networks for digital cable service. And now the telephone companies are spending billions to bring fiber optic lines directly into homes in a bid to leapfrog cable. But San Jose, Calif., startup BroadLogic says its TeraPIX video processing chips will help cable companies use their existing pipes more efficiently without needing to move to fiber. The video chips can handle so many simultaneous streams of video that they let cable companies transmit data entirely in digital form, tripling the capacity of their networks so that they can offer more digital services, such as VoIP. The TeraPIX chips are built into network gateways outside of homes, which then eliminate the need for a set-top box on every single cable-connected TV in the home. With the extra capacity, cable companies could add as many as 160 new standard TV channels or 50 more high-definition TV channels, says BroadLogic CEO Danial Faizullabhoy. He expects companies to use the chips in equipment trials in 2007 and likely deploy them in finished products in 2008. ▲

Compiled by Blaine Flamig

Bringing Photos To Life With Photosynth



"What if your photo collection was an entry point into the world, like a wormhole that you could jump through and explore..."

Microsoft Live Labs' Photosynth (labs.live.com/photosynth) is one of those technologies that's so visually cool and full of promise, you have to share it with others, though doing it justice with words is nearly impossible. Essentially, Photosynth analyzes thousands of photos taken of a common environment or object and uses similarities among them to build a virtual, yet strikingly realistic, 3D model. Thus, you could virtually walk or fly through a 3D model built of the Lincoln Memorial, zooming in and out on Abe from any angle. Photosynth can use photos gathered from any number of sources and detail in the model exactly where each photo was taken in relation to the others. As of mid-November, Photosynth was still in the Technology Preview stage, but the working collections at the site are fantastically eye-opening. ▲

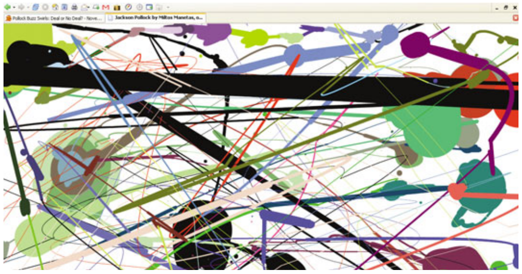
Mrs. Peter Brady, You're No Lara Croft

Who could've guessed while Peter Brady was bloodying up that bully for picking on little, lisping Cindy that Mr. Pork Chops And Applesauce would one day be married to the inspiration for the world's first virtual celebrity. Such became the case, though, when Nvidia bestowed Adrianne Curry the honor in November 2006 as part of its GeForce 8800-related launch festivities. Though Curry's virtual likeness is strangely fetching, we're not sure how "America's Next Top Model," "The Surreal Life," and "My Fair Brady" makes anyone a celebrity. Still, Curry, who wed Peter—er, Christopher Knight—in May, is already kicking Lara Croft to the curb: "The digital Adrianne is so realistic, it's really trippy. Lara Croft, eat my shorts!" Trippy, indeed. ▲

Shooting Phish In A Web Page

Reeling in all the phish swimming in the vast Internet ocean is a major undertaking, but we admire David Ulevitch for even trying. Ulevitch, founder of OpenDNS, created PhishTank (www.phishtank.com) as a centralized location for publicly accessible phishing data, including page after page of suspected and verified phishing sites. Unlike some similar services, PhishTank doesn't charge to view the information. Instead, a free registration lets you search the site, submit suspected phish, track and vote on submissions, and use a free, open API to build phish-reporting apps. As of early November 2006, users made 12,394 submissions, with 7,027 being verified as online/offline phish. ▲

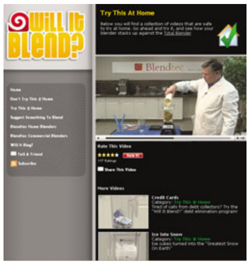
Site Seeing



Jackson Pollock: Genius Or Loon?

Recent reports that media mogul David Geffen sold his Jackson Pollock "No. 5, 1948" to David Martinez (who later denied buying the painting) for a record $140 million spurred a debate among a few of us editorial types and some artists in our office: Was Pollock a paint-dripping genius or just a big drip? Both sides make good points about Pollock's "talent," but one thing both sides can agree on with equal pleasure is that JacksonPollock.org is all kinds of mindless fun. This one-page, Flash-based site gives you a blank virtual canvas onto which to drip and drop. Alcohol not included. ▲

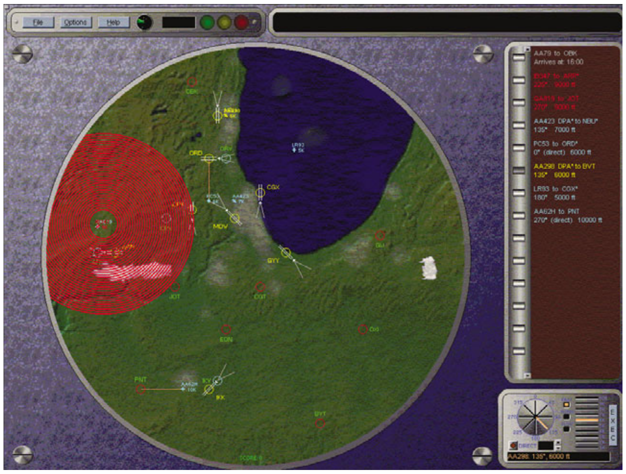
Will It Blend? That Is The Question



Ever see David Letterman's recurring sink-or-float skit in which Dave and crony Paul Schaeffer predict whether an object they toss in water will bob or take a dive? If so, you'll love Will It Blend? (www.willitblend.com). Here, host Tom Dickson stuffs golf balls, pop cans, marbles, and more into a Blendtec Total Blender to clear up mysteries that have been plaguing man for ages. The videos, organized into Don't Try This At Home and Try This At Home categories, are well-produced and witty, though they also serve as advertising for Blendtec. We were inspired to submit our own suggestions after watching Dickson puree a Big Mac, fries, and vanilla shake into "24 ounces of wonderful meal." ▲

What's Happening • Software

Compiled by Steve Smith



Staring At Radar For Fun

Demonstrating that there's a market for just about any imaginable computer simulation, the new Air Command 3.0 ($39.95; www.sharapnelgames.com) puts you in the seat of an air traffic controller. Enjoy the thrills and chills of keeping scores of airliners on course and out of each other's way. The familiar radar tracking screen is your primary interface, but you also hear pilot chatter on the audio track and see realistic weather effects. And if that's not realistic enough, try the hard-core ATCsimulator2 ($59.95; www.atcsimulator.com), which is so detailed that the publisher suggests it can "boost your career" in the industry. ▲

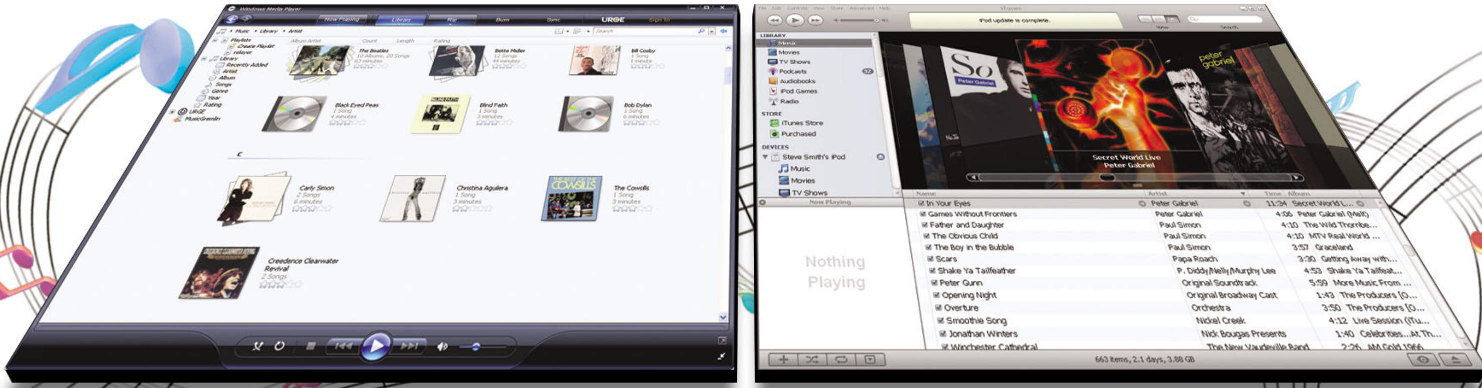
IE7 Launches, Firefox 2.0 Parties Down

We're not going to get into the middle of this one until we have more hands-on experience with both, but Microsoft and Mozilla went head to head in late October with dueling releases of Internet Explorer 7 and Firefox 2.0, respectively. The Microsoft PR blitz ensured what you already know: IE7 finally gets tabbing browsing, RSS feeds, and better security. Mozilla fans took a different tack: They partied down. Synchronized Firefox 2.0 release parties took place on the weekend of October 27 worldwide. According to the pin-filled map at FirefoxParty.com, there were 626 gatherings worldwide. We don't know which approach is geekier, cocktail parties with tech mag editors or a party around Firefox's new spell-checking and search-box suggestions. ▲

There were 626 parties worldwide to commemorate the late-October launch of Mozilla's Firefox 2.0.

Media Player 11 vs. iTunes 7:
Now It's Serious

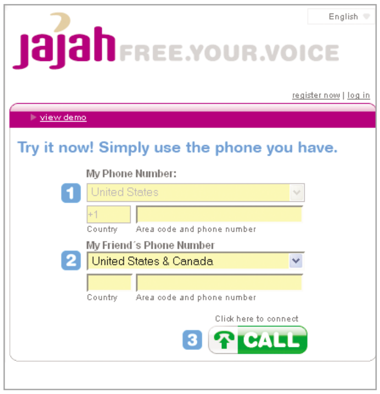
In yet another software duel involving Microsoft, its Windows Media Player 11 came out of beta only weeks after Apple substantially upgraded its iTunes media player and store. WMP 11 plays catch up, adding better library organization through album art, much improved device synching, and the Urge music store. Apple counters with an even snazzier Cover Flow interface that lets you browse through oversized cover art. It sports a great new view on your iPod, as well, including a graphical breakdown of its contents. Unfortunately, iTunes 7's initial release proved buggy on some of our systems, and even after two quick updates from Apple, it still runs sluggishly on several of our PCs. Maybe Apple and Microsoft are becoming more alike on a number of levels. ▲



Software Shorts

JaJah's Million-Caller Army

Trying to beat Skype with a better game, free voice service JaJah.com says it will have a million registered users by the time you read this. In JaJah's unique model, users enter their own landline phone number and that of another registered user in the simple online form, and JaJah calls both numbers and makes the connection for free. The company plans to make money by selling more sophisticated services, such as conference and mobile calling. According to the company, more than 20,000 users have already downloaded a dedicated JaJah application for mobile phones. ▲



Try it now! Simply use the phone you have.

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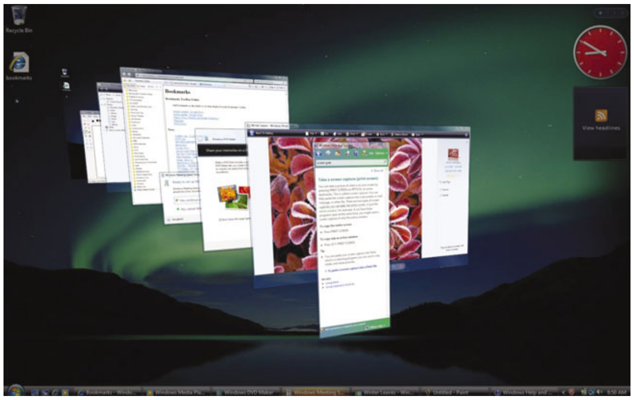
My Friend´s Phone Number: United States & Canada

Far-Off Vista Now In Sight

After playing coy for months with release candidates and separate launch windows for business and consumer markets, Microsoft finally announced that the code for Windows Vista is solid and the next-gen OS will be available for consumers on Jan. 30, 2007. Pricing and packaging remains varied and controversial. The four flavors are Home Basic ($99 upgrade), Home Premium ($159 upgrade), Business ($199 upgrade), and Ultimate ($259 upgrade). Quick reference for the eye-candy lovers: All but Home Basic come with the cool new translucent window panes and 3D task-flipping effects (Aero interface). ▲

Get ready to flip your screen, as most Windows Vista versions now bring 3D effects to the Desktop.



Xbox 360 2.0?

More than 80 updates comprised a major upgrade of the Xbox 360 dashboard and functionality in late 2006. The game console now can output video in 1080p and auto-download new Xbox Live Arcade demos. Our favorite addition, however, lets you stream WMV video from any PC also on the network. Using the new Windows Media Player 11, you simply toggle a feature that shares select folders in your video library and then lets you access this library on your TV via the 360. Let the great media convergence begin. ▲

BIOS Upgrades Available Online

Compiled by Steve Smith

Before you send another motherboard to the landfill, consider upgrading the BIOS and giving your PC a new lease on life. Here are a few recently released upgrades. Readers can check out www.cpumag.com/cpujan07/bios to see our entire upgrade list.

Motherboard	Date Available	URL
Abit AB9/AB9 Pro	10/19/2006	www.abit-usa.com/downloads/bios/ab9/ab915.zip
ASRock AM2NF6G-VSTA	10/24/2006	download.asrock.com/bios/AM2/AM2NF6G-VSTA(1.50)Win.zip
Asus M2V	11/01/2006	ftp://dlsvr03.asus.com/pub/ASUS/mb/socketAM2/M2V/M2V1003.zip
Asus P5PE-VM	11/2/2006	ftp://dlsvr03.asus.com/pub/ASUS/mb/socket775/P5PE-VM/P5PE1105.zip
Gigabyte GA-965P-DQ6	10/12/2006	america.giga-byte.com/FileList/BIOS/motherboard_bios_ga-965p-dq6_f6.exe
MSI K9A Platinum	9/28/2006	download.msi.com.tw/support/bos_exe/mbd_bios/7280v12.zip
MSI PT890 Neo-V	9/25/2006	download.msi.com.tw/support/bos_exe/mbd_bios/7258v34.zip
Tyan Thunder K8SE	10/19/2006	ftp://ftp.tyan.com/bios/s2892_203.zip

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Reach potential customers by advertising with **Microsoft® adCenter**. Your 1&1 vouchers* for search advertising help you target your ads to the times, places, and customers you want. Use built-in tools to get keywords ideas, audience information, and detailed reports.

*Offer is valid for a limited time for advertisers opening a new U.S. Microsoft® adCenter account. Minimum $5 sign-up fee required and other terms and conditions apply. See www.1and1.com. Microsoft is either a registered trademark or trademark of Microsoft Corporation in the United States and/or other countries.

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**Offer valid for new Google AdWords customers with self-managed sign-up accounts. Other terms and conditions apply. See www.1and1.com. Google and AdWords are trademarks of Google Inc. and are registered in the US and other countries.

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E-mail Accounts	2,000 IMAP or POP3	500 POP3	2,000 POP3
Mailbox Size	2 GB	2 GB	10 MB
Search Engine Submission	✓	✓	Extra charge applies
Website Builder	18 Pages	✓	Freeware
Flash Site Builder	18 Pages	–	–
Photo Gallery	✓	✓	✓
RSS Feed Creator	✓	–	$4.99/month
Blog	✓	✓	$2.99/mo. For ad-free blogs
Map & Driving Directions	✓	✓	–
Dynamic Web Content	✓	✓	–
Web Statistics	✓	✓	✓
E-mail Newsletter Tool	✓	$10/month	$3.99/month
In2site Live Dialogue	✓	–	–
Chat Channels	✓	–	✓
Form Builder	✓	✓	–
Premium Software Suite	✓	–	–
90-Day Money Back Guarantee	✓	–	–
Support	24/7 Toll-free Phone, E-mail	24/7 Toll-free Phone, E-mail	24/7 Phone, E-mail
Price Per Month	$9.99	$19.95	$14.99

Vouchers included

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Google AdWords**	$50 value
Citysearch	$50 value

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Compiled by Steve Smith

The Job Search

Aloha, network engineers! Computer Sciences Corporation is looking for someone to hop some Pacific islands to monitor WAN and LAN setups for the U.S. Army Corps of Engineers Emergency Response Mission. This isn't your usual IT gig. You need security clearance and a willingness to work a lot of overtime. You will be maintaining and updating mission-critical, highly sensitive networks for the Corps. Running Windows 2003 servers and troubleshooting everything from connectivity to peripheral issues will be within your broad portfolio of duties, but it sounds as if flexibility is your chief skill set. You may spend a lot of your time at the Honolulu home base, but have your bags packed for remote installations. You will be supporting remotes sites on Palau, Guam, and the famously isolated Kwajalein Atoll. This military base housing a ballistic missile defense site has a bustling population of 2,500 people. As CSC warns, "deployed environments could be highly stressful and demanding." Yeah, there's no EBGames in sight. That is stressful.

8.9 million

Americans willing to pay $500 to $600 for a PlayStation 3

Interpret

46%

Percentage of MySpace visitors over age 35

Nielsen//NetRatings

$32 billion

Estimated 2006 online holiday retail sales in the United States

JupiterResearch

43%

YouTube's share of all online video site traffic

Hitwise

Games Make A Smooth Next-Gen Transition

Transition years usually are tough on the video game industry. When last-generation machines lose their luster and the installed base of next-gen consoles slowly ramps up, game sales suffer. Not this time. NPD reports that games sales were up 11% so far in 2006, and that was before a holiday season that will see the Nintendo Wii and Sony PlayStation 3 join the Xbox 360 on the market. Apparently, people are still buying hundreds of thousands of PS2s each month and spending a lot of time with the Nintendo DS handheld. Who needs a next-gen console when the last one is doing just fine?

Who Do YouTurn To First?

According to LexisNexis, most Americans turn to traditional media outlets, TV, and radio during major news events.

TV	50%
Radio	42%
Local Newspapers	37%
Business/Cable Networks	33%
Newspaper/TV Web Sites	25%
Blogs/Internet User Groups	6%

Source: LexisNexis

The Saint

Happy Vista New Year!

by Alex St. John

With the impending Vista launch and the next-generation console wars finally in full swing, there's so much to talk about I almost don't know where to start. We'll begin by revisiting some predictions I've made in past columns and making some new ones for this year.

First, the console wars; for several years I've written that Sony has made some fatal mistakes in its PS3 strategy. I've said the PS3 is over-engineered, bizarrely architected, and hard to develop for. I've also said that if Sony doesn't aggressively try to match the level of investment Microsoft has made in software tools and online infrastructure, the PS3 won't be able to compete with the new generation of online console games and business models. To be fair, I've also said that the Xbox 360 architecture is unnecessarily difficult to develop for, but in spite of this Microsoft has made the strength of the Xbox 360's online services a major differentiating feature. Frankly, I counted Nintendo out of the game, a point about which I now believe I was pleasantly mistaken. The Nintendo Wii is actually a very elegant console design with classic Nintendo emphasis on great gameplay over gratuitous computing power. As ever, Nintendo gets it right by recognizing that great games start with the controller.

I made the prediction some time ago that the Xbox 360 would close the gap in console market share with Sony. It appears that this particular "prophecy" from The Saint will play out in 2007.

2007 will also be the year I get to find out how the rest of the world reacts to the "Can't do that!" Vista OS. I just hope that in the midst of all the Vista hype some intelligent journalist takes the time to ask a few of the hard questions about Vista, such as:

1. Why do I want 3D Windows? Does tilting text sideways somehow make it easier to read?
2. If Vista's major feature is better security, why do I need to pay for Microsoft Live OneCare? Is Vista not actually secure? If Microsoft didn't know how to make Vista secure, how did the company figure it out for OneCare? Can I just get OneCare for WinXP and skip buying Vista? Isn't Microsoft making commercial security products for its own OS a little like being a tobacco shop owner who moonlights as a lung doctor?
3. Explain how Limited User Accounts actually make me more secure? Is it because *always* accepting the OS warnings ensures my security by preventing me from using my computer for anything? How do I know which combination of warnings to accept or ignore to achieve security while still being able to use my PC productively?
4. Why is imitating Apple UI features and security an OS improvement? Isn't there a reason most people *don't* use Macs? Could it be that Apple's "security" stems from having no market share and thus presenting an uninteresting target to hackers? Or could it be that Apple users have so few choices in software that it's easy for everyone to remember the handful of applications that are safe to install?
5. Why should we shell out 300 bucks for an Xbox 360 if Vista is supposed to be a great game OS? If it's not a great game OS, did Microsoft screw it up deliberately to drive Xbox 360 sales? Why would I need to buy a new Vista PC for anything other than playing games? Did Microsoft find a way to make Office 2007 drag on my old 3GHz Pentium?
6. Why is the Vista Start menu harder to navigate and *more* confusing than the old WinXP start menu? Did they really need four years just to make Windows harder to use?

Just a few fun Vista questions that I'm sure the rest of the press and analysts won't ask, but consumers should. The uniquely Microsoft mentality that creates an OS like Vista can be found even in their public statements. When asked if the late launch of Vista would kill Christmas sales for the PC OEMs, Microsoft replied that it shouldn't because 80 to 85% of PCs sold this Xmas will be "Vista Eligible." What the company didn't mention was how the poor schmucks in the remaining 15% would discover their brand-new PC couldn't be "upgraded." ▲

Send your feedback to TheSaint@cpumag.com

Alex St. John was one of the founding creators of Microsoft's DirectX technology. He is the subject of the book "Renegades Of The Empire" about the creation of DirectX and Chromeffects, an early effort by Microsoft to create a multimedia browser. Today Alex is president and CEO of WildTangent Inc., a technology company devoted to delivering CD-ROM-quality entertainment content over the Web.

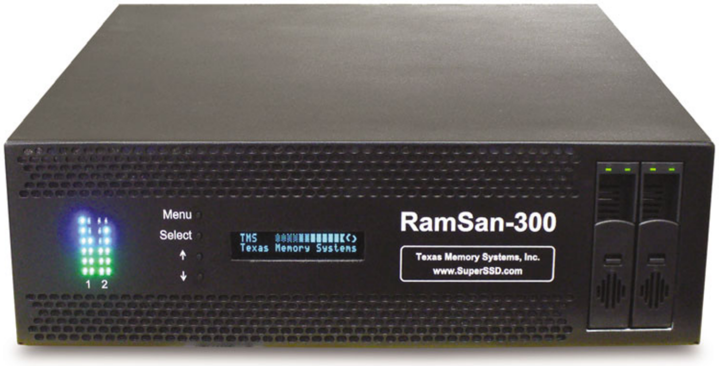
If Vista's major feature is better security, why do I need to pay for Microsoft Live OneCare?

DREAM HARDWARE

These Gizmos Don't Sing It, They Bring It

Data almost before you request it. Wall-to-wall video with the clarity of fine film. And rapid snapshots of everyone and everything around you at a given moment. These are your dreams. Why else have a credit card?

by Marty Sems



Seitz Phototechnik Roundshot D3

Woodstock. The fall of the Berlin Wall. Or even that after-hours party where you met your next ex. The Swiss-made Roundshot D3 (www.roundshot.ch) was born to capture important moments in incredibly detailed, 360-degree panoramas. Paired with its Seitz D3 digital scan back and using a custom DALSA sensor with 48-bit color depth and HDR, it can log a 470MP surround shot in two seconds. And it doesn't just make art, it *is* art. The hand-constructed camera has a body that's CNC-machined out of a solid aluminum block. Pony up your $37,500 and take a good look around.

Sony SRX-R220

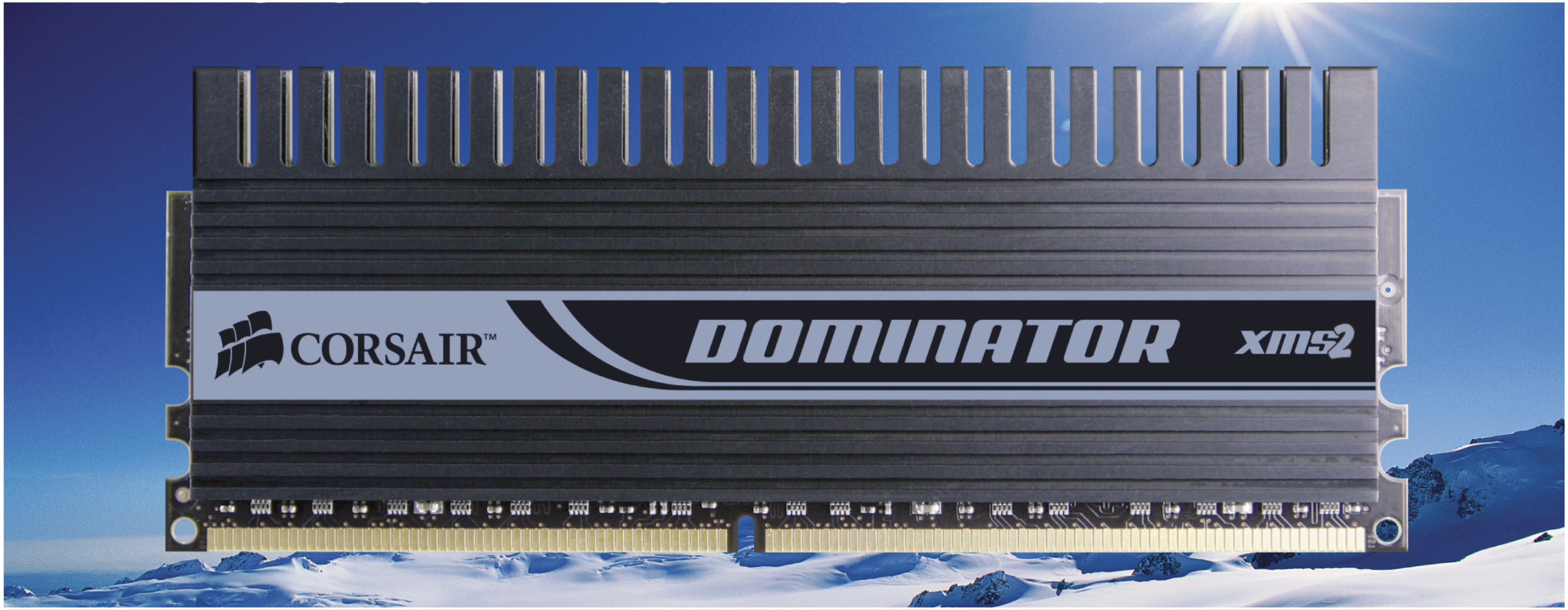
Come on, baby, light my saber. Sony's new SRX-R220 4K projector (www.sonybiz.net/4k) can beam out 18,000 lumens' worth of 4,096 x 2,160 video. That's quadruple the resolution of 1080i/p at roughly the same intensity of light the Death Star dished out. Sony doesn't have a price set yet, but the older, 10,000-lumen SRX-R110 goes for about $98,550. And then there's the "8K Super Hi-Vision" projector prototype that Japanese broadcasting company NHK (www.nhk.or.jp) has been showing off for a while. Its 22.2-channel, 24-bit PCM sound stage places speakers above, at, and below ear level. This 7,680 x 4,320, 60Hz, progressive-scan beast almost has a picture element for every bit of glowing debris from the erstwhile planet Alderaan. A cinematic pixel count like this could make former motion picture auteur George Lucas rethink his new allegiance to TV.

Texas Memory Systems RamSan-300

We're on the cusp of the solid-state storage era in enthusiast PCs. Advancements in NAND memory mean that Robson technology, hybrid hard drives, and SSDs will make long bootups and slow random accesses into problems that only happen to other people. Falling prices are key, so the big name in enterprise SSDs, Texas Memory Systems, has announced its new entry-level RamSan-300 (www.texmemsys.com). This $28,000 SSD can do 200,000IOps, making databases scream even with loads of concurrent users. Just think what it could do for your Quake 4 server. ▲

EPP Enhanced Performance Profiles

Cool Performance



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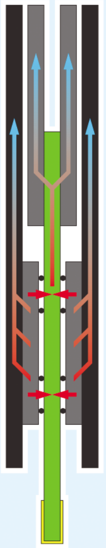
Here's the latest in Corsair's ten year heritage of innovation in performance memory: we've redefined memory heat sink technology. And the result is unprecedented performance and reliability. When we ran a preview module through system benchmarks at COMPUTEX, an overclocked DHX module with our optional airflow fan was able to hit a heart-stopping 1250MHz (PC-10,000) while maintaining cool, reliable performance.

Protect Components While You Push Performance

Pushing performance specs generates heat, and that can compromise reliability and component life. The advanced cooling ability of DHX heat sinks keeps your memory safe and reliable even as you push it to the limit. Under the name XMS2 Dominator, this DHX technology will be showing up on both Corsair parts designed for extreme overclocking and on memory designed for performance computing and gaming.

Also Featuring Enhanced Performance Profiles (EPP)

As with all new Corsair performance memory, XMS2 Dominator modules feature EPP, the new open standard for the Serial Presence Detect (SPD) jointly developed by NVIDIA and Corsair. EPP simplifies overclocking for beginners and provides unparalleled control for experts.



AIRFLOW

An optional fan (not shown) provides even more cooling and protection.

DHX DUAL-PATH HEAT XCHANGE

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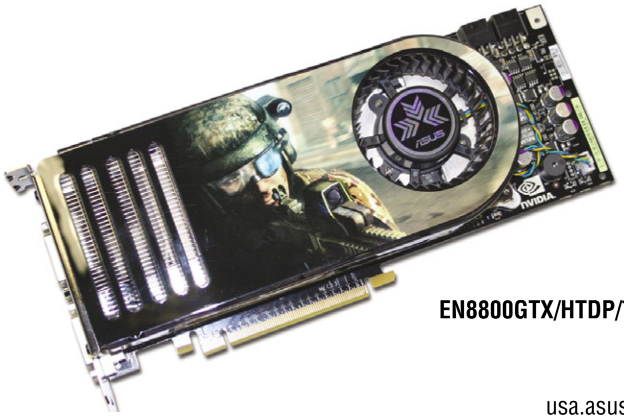
GeForce Of Nature

Five 8800 GTXes Show Us Their Wares



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●●●●

A matter of weeks after ATI launched the Radeon X1950 Pro and the X1650 XT, Nvidia rang in the New Year early with its latest graphics processor, the G80, and two new cards, the GeForce 8800 GTX and GeForce 8800 GTS. ATI ended the year with two new cards that are easy on the wallet; Nvidia capped 2006 with a new DirectX 10-compatible GPU that will blow your mind.

GeForce 8800

With regard to GPU architecture, not much changed between Nvidia's successful NV4x chips and the older NV3x GPUs. Even the various iterations of the G7x GPU designs were based on a fixed number of pixel shader units and vertex shader units that worked independently of each other as specialized processors. But with the G80, Nvidia has changed the rules of the game.

The GeForce 8 series utilizes a unified floating point engine that consists of a series of what Nvidia has dubbed stream processors. The GeForce 8800 Series cards utilize a single pool of stream processors (the GeForce 8800 GTX boasts 128 stream processors, and the GeForce 8800 GTS features 96), which the GPU can dynamically allocate to vertex- or pixel-shading operations as needed. There's no longer a limited number of units for each type of operation.

Nvidia's stream processors are also capable of handling other facets of the graphics workload, including those commonly offloaded to the CPU, such as physics operations. The chip design also accommodates new technologies, such as geometry shaders, a feature of Shader Model 4.0 and DX10, and other operations yet to be realized. The end result is a more efficient GPU design that lets the graphics card devote as much power as is necessary to the rendering demands at hand.

In conjunction with the new unified shader engine, Nvidia introduced GigaThread Technology, which lets the GPU simultaneously process thousands of independent execution threads. Similar to ATI's stream computing initiative, which uses ATI GPUs for media encoding and scientific research applications, Nvidia's multithreaded architecture lends itself well to other applications beyond gaming. Nvidia's version of the technology is called CUDA (compute unified device architecture), and it lets G8x-based GPUs soar in highly parallel, data-intensive applications, such as scientific research.

In conjunction with the new unified shader engine, which lets the GPU simultaneously process

Another new aspect of the G80's architecture is Nvidia's Lumenex image processing engine, which lets games and 3D applications display smooth edges with 16X CSAA (Coverage Sampling Anti-Aliasing), reduce blur and improve in-application perspective distortion with 16X anisotropic filtering, and display the fine details of high-resolution textures with the help of 16-bit and 32-bit floating point texture filtering. And the GeForce 8800s can deliver brighter and more immersive visuals with simultaneous 128-bit HDR. The Lumenex engine also uses a 10-bit display pipeline (10 bits of data for each unique color) to produce 1.07 billion colors. The previous generation was only capable of producing a mere 16.7 million colors.

On the video processing side of the G80 coin is Nvidia's PureVideo HD component, which consists of hardware-based decoders and video processors capable of displaying H.264 and other HD video formats in 720p, 1080i, and 1080p. The G80 also supports 3:2 and 2:2 pulldown of HD interlaced content.

GeForce 8800 GTX

The cards I tested all feature the same black PCB and dual-slot, translucent, smoke-black heatsink shroud, but it's what's sandwiched between the PCB and heatsink that counts. The G80 is based on a 90nm manufacturing process and sports a jaw-dropping 681 million transistors, which is well more than twice that of the transistor-bloated GeForce 7800

GeForce 8800 GTX
$599
XFX
www.xfxforce.com
●●●●

8800 GTX 768MB PCIe
$599.99
PNY Technologies
www.pny.com
●●●●

GTX, which featured 302 million transistors on a 110nm die. Such a glut of transistors calls for some serious power, though, and the GeForce 8800 GTX features two 6-pin PCI Express power connectors to supply the necessary juice.

Should you happen to forget to connect one or both of those power plugs to the card, a built-in speaker will provide you with a shrill reminder. According to Nvidia, you shouldn't even consider using the GeForce 8800 GTX unless you have a 450W or greater power supply with a 12V rail capable of supplying 30A or better. (However, XFX recommends using a 625W PSU for a single GeForce 8800 GTX and an 800W PSU for SLI.)

> Nvidia introduced its GigaThread Technology, thousands of independent execution threads.

The GeForce 8800 GTX features a 575MHz core clock and a 1,350MHz shader clock. The card includes 768MB of GDDR3 memory operating at 1.8GHz over a 384-bit memory bus. The GeForce 8800 GTX also features 24 ROPs. Despite Nvidia's unified architecture model, the ROPs remain separate.

The card itself is 10.5 inches long, and the heatsink shroud on the cards I tested extends about 9 inches from the card's mounting bracket. This card will most likely not fit into anything smaller than a full-sized case. Each GeForce 8800 GTX features two SLI connectors. I asked Nvidia's Desktop PR Manager Brian Burke about the two connectors, and he replied rather cryptically (yet not unsurprisingly) that they're for "future expansion." For the time being, running two GeForce 8800 GTX cards in SLI only requires a single SLI bridge

Nvidia's flagship GeForce 8800 GTX graphics card supports two dual-link DVI connectors and both SD and HDTV outputs. The G80 is fully HDCP-capable, letting you watch Blu-ray or HD DVD movies at native resolutions (as long as you have an HDCP-capable monitor).

While we're on the topic of resolutions, the 8800 GTX supports resolutions of up to 2,560 x 1,600, and Nvidia recommends a minimum resolution of 1,600 x 1,200 in order to really take advantage of the card's power. CPU bottlenecking may affect performance below 1,600 x 1,200.

DX9 is another limiting factor. With DX9, the GPU uses the CPU as a crutch to communicate between the API and the driver. DX10 significantly reduces the formerly CPU-bound routines and lets the GPU handle these low-level operations more efficiently. However, as we wait patiently for the first DX10 titles, my tests used Windows XP and the October 2006 release of DX 9.0c.

The Cards

My test rig included an AMD Athlon 64 FX-62 processor, Foxconn's C51XEM2AA nForce 590 SLI motherboard, 2GB Corsair XMS 800MHz DDR2 memory, and a 10,000rpm WD740GD HDD. I used Dell's 30-inch 3007WFP monitor to run tests at 2,560 x 1,600. Like all first-gen 8800 GTXes, the cards I tested all follow Nvidia's reference design and have factory default clock speeds.

Asus EN8800GTX/HTDP/768M

The GeForce 8800 GTX I initially tested from Asus was adorned with a rather bland black-and-green decal on the heatsink shroud and arrived in a FedEx box unceremoniously wrapped in foam. But late in the process, Asus sent me the full retail package, which included a Ghost Recon-themed 8800 GTX and a copy of the game (Ghost Recon Advanced Warfighter). The package also included a DVI-to-VGA adapter, two 6-pin PCI-E power adapters, a component breakout cable, driver CD, SpeedSetup guide, 3DMark06, GTI Racing, an Asus software bundle, and a pleather CD case. Asus offers a three-year warranty on its GeForce 8800 GTX.

As I mentioned above, the cards were all based on the same reference design and set to the factory defaults. Despite this, at 1,280 x 1,024, the Asus card achieved the highest 3DMark06 score of the bunch by 84 points. It may not sound like much, but it does stand out against the other

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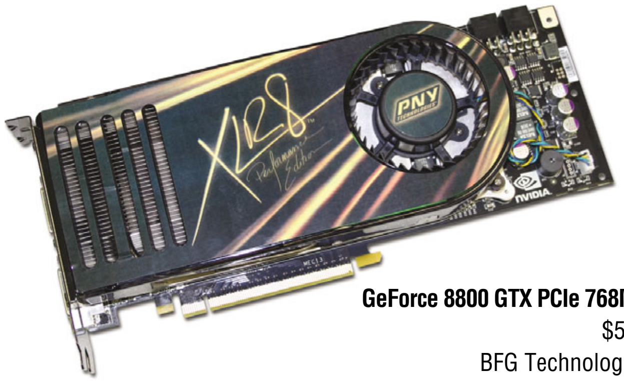
WinFast PX8800 GTX TDH
$659
Leadtek
www.leadtek.com
●●●●



GeForce 8800 GTX PCIe 768MB
$599
BFG Technologies
www.bfgtech.com
●●●●

four cards which all scored at or below 9850. Asus also took the crown in the F.E.A.R. demo at every resolution except 2,560 x 1,600.

XFX GeForce 8800 GTX

The XFX version of the GeForce 8800 GTX arrived in the full retail package decorated with a rather angry-looking canine. The same sinister pooch appears on the GeForce 8800 GTX card itself, but the rest of the unit was stock. The card ships with a driver disc, a quick install guide, two DVI-to-VGA adapters, a component breakout cable, and an S-Video cable. Although XFX didn't ship any games or bundled software with the GeForce 8800 GTX, later editions may include these extras. XFX backs up its card with its Double Lifetime warranty, which means you and the next guy who buys your card are covered should anything happen.

The XFX card performed comparably to the other cards in most of the benchmarks. It stood out in Far Cry, notching 117.49fps and 135.45fps in the training and research demos, respectively, at 2,560 x 1,600. The scores were a few frames faster than the next highest scoring cards from BFG and Asus. XFX also managed the highest fps in my custom Oblivion dungeon demo, at a resolution of 1,600 x 1,200 with 4X antialiasing, HDR, and 8X aniso.

PNY 8800 GTX 768BB PCIe

PNY sent me the retail version of its GeForce 8800 GTX, which comes in an attractive flat black box with gold foil lettering. The heatsink shroud on the card itself features PNY's XLR8 Performance Edition logo on a black-and-gold background. With regard to accessories, PNY threw in two DVI-to-VGA adapters, two 6-pin PCI-E power plug adapters, a component breakout cable, an S-Video cable, a driver CD, and a coupon for a free copy of System Mechanic 6.

The PNY card made it to the top of the heap in F.E.A.R. at 2,560 x 1,600 with a 77fps score. At the same resolution, PNY's card also performed slightly better in my custom Oblivion town demo, scoring 56.8fps. This resolution slightly tripped up the PNY card in Quake 4: At 83.83fps, it was almost 4fps slower than the rest of the cards I tested.

PNY offers a three-year warranty out of the box and tacks on an additional two years once you register the card online.

Leadtek WinFast PX8800 GTX TDH

The WinFast PX8800 GTX TDH I tested arrived without the final retail box and came adorned with a red and black logo. (Leadtek also offers another version of the GeForce 8800 GTX that has a modified heatsink fan capable of reducing fan noise to about 25dB.) Accessories include a DVI-to-VGA adapter, two 6-pin PCI-E power adapters, a component and S-Video breakout cable, and a driver CD. Bonus software and full versions of SpellForce 2 and Trackmania Nations sweeten the deal.

Of the benchmarks I ran, Oblivion is far and away the most demanding. The Leadtek card managed to score 33.1fps on my outdoor demo at 2,560 x 1,600. That's almost 2fps faster that the rest of the GeForce 8800 GTX cards in the roundup. At the same resolution, the WinFast PX8800 GTX TDH card also achieved the highest 3DMark06 score.

Leadtek includes a three-year parts and labor warranty on the WinFast PX8800 GTX TDH.

BFG Technologies GeForce 8800 GTX PCIe 768MB

BFG Technologies' GeForce 8800 GTX came in the full retail box and featured BFG's custom yellow-eyed decal affixed to the stock heatsink shroud. In the box you'll find a BFG T-shirt, a pack of Teflon Slick Pads for your mouse, two DVI-to-VGA adapters, two 6-pin PCI-E adapters, a component breakout cable, a driver CD, BFG stickers, and a quick install guide.

Although all the cards scored similarly, BFG's version managed to edge its competition with a 2637 in both the overall and HDR/SM3.0 tests in 3DMark06 at 2,560 x 1,600. At lower resolutions, however, it trailed the pack.

It also managed to post the second-highest scores in F.E.A.R. at both 2,560 x 1,600 and 1,280 x 1,024 (76fps and 116fps, respectively). It unexpectedly scored the lowest of the five cards in F.E.A.R. at 1,600 x 1,200 (109fps).

BFG offers free 24/7 technical support and a lifetime warranty on its GeForce 8800 GTX.

A Whole New Game

As the scores in the Benchmark Numbers chart illustrate, there's little

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difference between the scores in F.E.A.R., Far Cry, and Quake 4 when tested at 1,280 x 1,024 and 1,600 x 1,200. Only 3DMark06 and Oblivion seemed to register a performance hit between the two resolutions. It wasn't until I ran the card at 2,560 x 1,600 that these cards even started to break a sweat.

Although Microsoft had released Vista manufacturers at press time, a DX10 driver didn't exist with which to push the limits of the GeForce 8800 GTX. Not to mention, a host of DX10 games, such as Crysis, Hellgate: London, Flight Simulator X, and Alan Wake, aren't expected to arrive until early 2007.

The GeForce 8800 GTX is a powerful graphics card that blows through some of the more graphically demanding games currently available, but don't expect to see these cards fully stressed until DX10-based games hit the street. In my preliminary opinion, however, Nvidia can put an exclamation point behind its "The Way It's Meant To Be Played" slogan. ▲

by Andrew Leibman

Benchmark Numbers*

Although we're all waiting with bated breath to see DX10 gaming unleashed, the GeForce 8800 GTXes are plenty feisty with these DX9 mainstays. With results like these, it's easy to see why the GeForce 8800 GTX is the current king of the hill.

		Asus EN8800GTX/ HTDP/768M	XFX GeForce 8800 GTX	Leadtek WinFast PX8800 GTX TDH	BFG GeForce 8800 GTX PCIe 768MB	PNY 8800 GTX 768MB PCIe
3DMark06	1,280 x 1,024	9934	9823	9837	9803	9850
3DMark06 HDR/SM3.0		4748	4693	4694	4688	4691
Far Cry 1.33						
Training		143.98	144.04	141.7	140.23	141.49
Research		194.91	189.96	184.13	191.14	186.48
F.E.A.R.**		122	115	112	116	114
Quake 4***		102.66	102.89	102.11	103	103.04
Oblivion (HDR Enabled)						
Outdoor		65.50	64.76	66.79	63.85	64.38
Town		57.35	60.34	58.89	54.31	57.66
Dungeon		67.74	65.22	69.50	64.70	68.59
3DMark06	1,600 x 1,200	9088	9116	9091	9044	9096
3DMark06 HDR/SM3.0		4118	4121	4079	4121	4083
Far Cry 1.33						
Training		141	141.09	141.57	142.14	139.59
Research		192.41	190.57	186.57	189.2	186.32
F.E.A.R.		115	113	112	109	110
Quake 4		103.74	101.98	102.24	92.31	102.23
Oblivion (HDR Enabled)						
Outdoor		54.62	54.68	57.78	54.22	54.79
Town		58.98	56.69	53.77	55.3	54.30
Dungeon		65.46	67.01	65.40	65.51	64.69
3DMark06	2,560 x 1,600	6665	6669	6716	6684	6702
3DMark06 HDR/SM3.0		2615	2616	2616	2637	2615
Far Cry 1.33						
Training		113.69	117.49	113.71	114.04	109.12
Research		128.1	135.45	128.08	127.83	127.9
F.E.A.R.		74	73	74	76	77
Quake 4		87.68	87.75	87.87	87.46	83.83
Oblivion (HDR Enabled)						
Outdoor		31.90	31.08	33.14	31.85	31.35
Town		55.58	53.88	54.84	54.01	56.84
Dungeon		63.29	60.78	61.17	61.65	61.55

*All game tests run with 4XAA/8XAF **Soft Shadows Disabled on all F.E.A.R. tests
***Dual-core CPU support enabled on all Quake 4 tests

Specs: GPU: GeForce 8800GTX; GPU clock: 575MHz; 768MB GDDR3 memory (900MHz); 128 stream processors; Driver Version 6.14.10.9697

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

GeForce 8800 GTS Mini-Roundup

A Trio Of GTS Cards Go Head-To-Head-To-Head

Although Nvidia's GeForce 8800 GTS may not be top dog in terms of performance, it's an excellent product nonetheless. The 8800 GTS actually shares many features with the new flagship 8800 GTX. (They're based on the same GPU, after all.) The two cards do differ in a number of meaningful ways, however. First, the GTS is built upon a shorter, 9-inch PCB, as opposed to the 10.5-inch monster used on the GTX. The GTS also requires less power. Nvidia recommends a 400W PSU that can supply 26A on its 12V rails for the GTS, and the GTX requires a 450W PSU capable of supplying 30A on its 12V rails. Because the GTS isn't quite as power-hungry as the GTX, it has only a single 6-pin PCI Express power connector. (The GTX has two.) I should also note that the GeForce 8800 GTS has only a single SLI connector. At some point, the more powerful GTX's dual-SLI connectors are likely to offer a few additional features in SLI.

Where the two cards differ most is in their frame buffer configurations, clock speeds, and the number of stream processors enabled in their GPUs. The GTS' GPU has "only" 96 stream processors enabled, compared to the GTX's 128. Having fewer stream processors means the GTS can't match the GTX's pixel and vertex shader performance. The GTS' GPU and memory clock speeds are also somewhat lower than the GTX's. Nvidia's reference specs indicate the GTS' GPU, stream processors, and memory clocks are supposed to be 500MHz, 1.2GHz, and 1.6GHz, respectively. In reality, though, the GPU and memory clocks are 513MHz/1.584GHz (GPU/memory). The GTX's reference clocks are slightly higher, however, coming in at 575MHz, 1.35GHz, and 1.8GHz (GPU/streaming processors/memory).

e-GeForce 8800 GTS
$469.99
Evga
www.evga.com
●●●●◖

The GTX is also outfitted with a larger frame buffer (768MB), and its memory utilizes a wider bus interface (384-bit). The GTS musters a 640MB frame buffer with a 320-bit interface. This combination of the 8800 GTX's higher memory clocks and wider interface give it an edge with regard to available bandwidth. The GTX offers a theoretical peak of 86.4GBps, while the GTS maxes out at 64GBps.

So, what's with the verbose introduction? I pulled together a trio of GeForce 8800 GTS cards for this mini-roundup, and they're virtually identical from a hardware and performance standpoint. With the exception of the decal affixed to their respective fan shrouds, the cards themselves don't differ in any way. Each product ships with a different accessory bundle and has a different warranty, which helps differentiate the group.

Evga e-GeForce 8800 GTS

Evga's e-GeForce 8800 GTS has a distinct advantage over its peers—one of the lowest street prices of any GTS at the time of this writing. Plus, if you aren't planning on selling the card, its lifetime warranty is on par with XFX's.

Evga bundles the e-GeForce 8800 GTS with a nice assortment of accessories and software. Aside from the card itself, two DVI-to-DB15 monitor adapters, an S-Video cable, an HD component output dongle, a 6-pin PCI-E power adapter, a users manual, some Evga decals, and a pair of CDs complete the package. One contained the obligatory drivers, but the other was a full version of the brand-new game Dark Messiah. Dark Messiah is a great title to showcase some of the e-GeForce 8800 GTS' capabilities, so I have to commend Evga for its inclusion.

The Evga e-GeForce 8800 GTS proved to be a decent overclocker, too. I was able to take the card up from its stock GPU and memory clock speeds to 644MHz and 1,828MHz, respectively. The boost in clock speeds resulted in a default 3DMark06 score of 10236, which was a nice increase over its stock performance.

XFX GeForce 8800 GTS

XFX's take on the GeForce 8800 GTS is next. This 8800 GTS offers the best warranty of the group. The company's Double Lifetime warranty essentially means its GTS

Specs:	Evga e-GeForce 8800 GTS	Asus EN8800GTS/HTDP/640M	XFX GeForce 8800 GTS
Stream processors	96	96	96
Stream processor clock	1.2GHz	1.2GHz	1.2GHz
GPU clock	513MHz	513MHz	513MHz
Frame buffer	640MB (GDDR3)	640MB (GDDR3)	640MB (GDDR3)
Memory clock	1,584MHz	1,584MHz	1,584MHz
Bus width	320-bit	320-bit	320-bit
Outputs	Dual-link DVI (x2) HD/S-Video out	Dual-link DVI (x2) HD/S-Video out	Dual-link DVI (x2) HD/S-Video out

CPU RANKING ○ **0 = ABSOLUTELY WORTHLESS** | ●●◖ **2.5 = ABSOLUTELY AVERAGE** | ●●●●● **5 = ABSOLUTELY PERFECT**

has a transferable lifetime warranty if you decide to sell the card.

Despite having such an attractive warranty, the XFX GeForce 8800 GTS' accessory bundle pales in comparison to the other two cards. A basic driver CD, quick installation guide, HD component output dongle, S-Video cable, and two DVI-to-DB15 monitor adapters compose the package; sadly, there are no games to speak of. And with benchmark results so close to its brethren GTS cards, there's nothing special to entice consumers to choose the XFX GeForce 8800 GTS over another.

Like the Evga card, the XFX GeForce 8800 GTS turned out to be a pretty good overclocker. I was able to boost the card's GPU and memory frequencies to a completely stable 638MHz/1,823MHz. The resulting overclock produced a default 3DMark06 score of 10215. Not too shabby.

Asus EN8800GTS/HTDP/640M

Asus' EN8800GTS/HTDP/640M rounds out the trio. Despite being the same card, save for a couple of custom decals, and offering the most basic warranty of the bunch (three years), the EN8800GTS is the most expensive of the cards represented here. I suspect the increased cost is likely due to its accessory bundle.

The EN8800GTS/HTDP/640M ships with a leather, 16-CD carry case, quick installation guide, one DVI-to-DB15 adapter, a dual 4-pin Molex-to-PCI-E power adapter, HD component output dongle, and five CDs. Two of the discs contain a boring but essential collection of drivers, manuals, and a handful of proprietary Asus-branded applications, but the remaining three contain full versions of 3DMark06, GTI Racing, and Tom Clancy's Ghost Recon: Advanced Warfighter—a nice assortment of swag.

The Asus card also deserves kudos for overclocking to the highest level, even if it was by a small margin. I cranked the card's clocks to 649MHz and 1,849MHz (GPU/memory). Those clock speeds netted a default 3DMark06 score of 10302. ▲

by Marco Chiappetta

GeForce 8800 GTS
$479.99
XFX
www.xfxforce.com
●●●●

EN8800GTS/HTDP/640M
$499.99
Asus
www.asus.com
●●●●

Performance Profiles: It's All About Frame Rates

My test system consisted of a Core 2 Extreme X6800 processor, 2GB of Corsair Dominator PC2-1111 RAM, a WD Raptor HD, and an Evga nForce 680i motherboard. I installed Windows XP Professional, the October 2006 DirectX 9.0c redistribution, and Nvidia's Forceware v96.97 drivers.

Due to the fact that all three of the GTS cards tested were clocked at the exact same speeds, there's very little to differentiate one card from another in terms of performance. For reference, I've also included scores from Nvidia's GeForce 7950 GX2 and ATI's Radeon X1950 XTX. And the Nvidia GeForce 8800 GTS scores listed below are indicative of a reference card with Nvidia's recommended 500MHz/1.6GHz clocks (core/memory). After sending the cards through 3DMark06 with its default settings, I ran all game tests with 4X antialiasing and 16X anisotropic filtering enabled.

The GeForce 8800 GTS is a strong performer. No other single-GPU card can match its overall performance, save for the big daddy 8800 GTX. The Radeon X1950 XTX is strong at high resolutions thanks to its super-fast GDDR4 memory, and the 7950 GX2's dual-GPU nature gives it a slight edge in some instances. But looking at these scores, I'd take the DX10-compliant, unified GeForce 8800 GTS over all of its current competition.

	Evga e-GeForce 8800 GTS	Asus EN8800GTS/ HTDP/640M	XFX GeForce 8800 GTS	Nvidia GeForce 8800 GTS	Nvidia GeForce 7950 GX2	ATI Radeon X1950 XTX
3DMark06 v1.02						
Overall	8768	8784	8774	8573	8772	6689
Shader Model 2.0	3741	3748	3744	3635	3808	2259
Shader Model 3.0	3763	3771	3768	3655	3667	2817
Half Life 2: Episode 1						
1,600 x 1,200	96.97	97.12	97.14	96.24	89.43	73.21
1,920 x 1,200	81.87	81.84	81.89	80.03	75.15	62.74
2,560 x 1,600	39.95	39.92	40.16	39.17	40.44	37.01
F.E.A.R. v1.08						
1,600 x 1,200	59	60	60	60	73	57
1,920 x 1,200	51	51	51	51	63	48
2,560 x 1,600	17	17	17	17	25	23
Quake 4 v1.3						
1,600 x 1,200	113.2	113.1	131.1	112.4	120.9	98.7
1,920 x 1,200	99.7	99.6	99.7	98.8	107.6	86.7
2,560 x 1,600	48.8	48.8	48.9	48.2	57.7	54.6
Prey v1.2						
1,600 x 1,200	72.1	72.1	72.1	71.6	84.1	61.6
1,920 x 1,200	62.3	62.3	62.4	62.7	72.6	53.3
2,560 x 1,600	32.3	32.2	32.4	31.9	40.3	32.7

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

Pioneer BDR-101A

DVD times five. Or DVD DL times 2.5.

The Japanese-built BDR-101A is Pioneer's premier—and premiere—BD drive. It writes single-layer, 25GB BD-R (write-once) and BD-RE (rewriteable—why not just call it BD-RW?) at 2X, where 1X BD means 4.5MBps (about 3.3X DVD or 30X CD). The drive also can read BD-ROM, BD-R, and BD-RE at 2X.

What the BDR-101A *can't* do is write to double-layer 50GB BD. It also doesn't support CD, HD DVD, or DVD-RAM. In other words, don't trash your red-laser unit just yet.

Pioneer installed two laser diodes, one for BD and one for DVD, which share a lens. Likewise, Pioneer split the cache buffer into 8MB (BD) and 2MB (DVD).

In most respects, the BDR-101A acts and feels the same as any DVD drive, albeit slower. I tested a BDR-101ABK (black bezel) on its merits as a storage device (but a DVD of "The Matrix" looked fine). I used the Roxio Digital-Media SE V7 (Build 2.6.25j) software that came with the drive for compatibility reasons. A BD-R/RE25 disc has 22.6GB usable space, so I timed file transfers of a 20.6GB folder.

Foremost on the cons list: That 2.5X capacity bump will cost you 20X the price of a DL burner, and discs currently start at $13. Three other strikes against this (or any BD or HD DVD drive) are its new copy-prevention technologies. There's ROM Mark, AACS (Advanced Access Content System), and something called BD+ to cripple playback on a hacked drive.

As was the case with earlier optical drive technologies, Blu-ray drive and media prices will fall. The question will be whether all those GBs are worth the DRM. ▲

by Marty Sems

BDR-101A
$999 (online)
Pioneer
www.pioneerelectronics.com
●●●

The Numbers

Pioneer BDR-101ABK Blu-Ray ATAPI
(firm. 1.01; 1X BD = 4.5MBps; times in min:sec)

20.6GB TDK BD-R25	52:32 (2X TDK)
20.6GB BD-RE25	56:08 (2X TDK)
4GB DVD+R	11:47 (8X Verbatim)
4GB DVD-R	14:53 (8X Verbatim)
8GB DVD+R DL	44:33 (2.4X Verbatim)
8GB DVD-R DL	failed (2X Verb)
8.2GB movie ISO Rip	27:12

Specs: Speeds: 2X/2X/2X BD-RE, 8X/4X/8X DVD±RW, 2.4X DVD+R DL, 2X DVD-R DL; ATAPI; Buffer: 8MB BD, 2MB DVD

Asus EN7950GT/HTDP/512M

Nvidia and ATI continue their never-ending, one-up campaign against each other in the 3D graphics arena, and it's driving prices down for consumers, especially in the midrange. Nvidia's last $299 card with best bang for the buck was the GeForce 7900 GT, and in its last fall refresh, the company upped the ante again in the $300 range with the introduction of the GeForce 7950 GT. This card takes clock speeds up a notch and expands onboard memory from 256MB to a full 512MB.

Asus stepped up to the plate and offered the EN7950GT/HTDP/512M, a standard GeForce 7950 GT setup based on the original reference design engine and memory clock timings. But Asus decided to attract prospective gamer customers by bundling the hot new Tom Clancy title, Ghost Recon Advanced Warfighter. The card also comes with dual-DVI connectors and Asus' standard healthy assortment of cabling and adapters for things like HDTV output.

I ran my benchmarks on an Athlon 64 FX-60 test machine, and the EN7950GT performed as expected. The card put up numbers somewhere in the neighborhood of 80 to 85% of the performance of a high-end GeForce 7900 GTX and right on par with other standard 7950 GT cards on the market.

Other manufacturers such as XFX and BFG are offering factory-overclocked cards, but those also cost a tad more as a result. So if you're in the market for a standard, well-built GeForce 7950 GT, you'll have a much easier time finding the EN7950GT closer to that magical sub-$300 price target. And you'll even get to let all those leading-edge pixel shader engines stretch their legs in a few rounds of G.R.A.W.-induced mayhem. ▲

by Dave Altavilla

EN7950GT/HTDP/512M
$299
Asus
usa.asus.com
●●●●

The Numbers

Asus EN7950GT/HTDP/512M

3DMark06	
Overall	5277
SM2.0	2156
HDR/SM3.0	2144
F.E.A.R. 1.07	
1,600 x 1,200 4XAA/8XAF	40
Prey	
1,600 x 1,200 4XAA/16XAF	49
Half-Life 2: Episode 1	
1,600 x 1,200 4XAA/16XAF	56.72

Specs: GPU: GeForce 7950 GT; GPU clock: 550MHz; Memory: 512MB (700MHz); dual-DVI outputs; bundled with Ghost Recon Advanced Warfighter

CPU RANKING ○ **0 = ABSOLUTELY WORTHLESS** | ●●◖ **2.5 = ABSOLUTELY AVERAGE** | ●●●●● **5 = ABSOLUTELY PERFECT**

Intel Core 2 Extreme QX6700

QX6700
$999
Intel
www.intel.com
●●●●

Specs: 2.66GHz; 1,066MHz FSB; 0.65-micron manufacturing process; 8MB L2 cache (4MB x2, dynamically allocated)

Intel's brand-new, quad-core CPU comes hot on the heels of the Core 2 Extreme X6800, which boasts two cores, impressive performance, and plenty of overclocking headroom in its own right. The Core 2 Extreme QX6700 has lower default clock speed of 2.66GHz but ups the ante with 8MB of L2 cache split between its two dies. It also has an unlocked multiplier, giving enthusiasts another overclocking option.

My test rig included 2GB of Corsair CM2X1024-8500C5 DDR2 memory at 1,066MHz, an Evga Nvidia GeForce 7950 GX2 graphics card, and a 10,000rpm, 74GB Western Digital Raptor WD740. A 1,000W Enermax Galaxy EGA1000EWL powered the system.

Although Intel's stock heatsink didn't have any trouble cooling the QX6700 at default settings, it started to cause problems shortly after I started overclocking. The system failed to boot when the CPU hit 2.8GHz and refused to start again after I bumped the voltage from 1.35V to 1.4V. It started Windows at 1.5V and ran 3DMark06, but produced an unacceptably low score of 4930.

Boosting the voltage to 1.6V (the D975XBX2's max voltage) put my test PC back in the game, but the QX6700 again topped out at 2.8GHz on the nose. The BIOS' hardware monitor, which initially reported temperatures close to 40 degrees Celsius, indicated a jump above 70 C. At this point, I rustled up a Zalman CNPS9500 LED heatsink, which dropped the temps substantially and opened up the processor for more overclocking.

My test system finally maxed out at 3.45GHz but scored 9224 and 8355 in 3DMark06 and PCMark05, respectively, when I eased the throttle back to 3.44GHz. Those aren't bad increases, but I suspect that the CPU will really shine when new games and other apps designed to take advantage of the multiple cores arrive. Even so, the QX6700 earns its keep at stock settings and is very overclockable. ▲

by Joshua Gulick

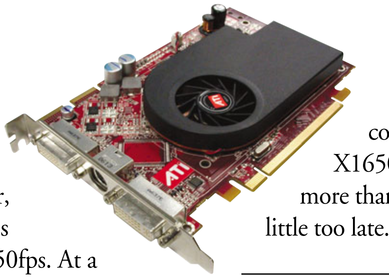
Clock speed (10X multiplier)	Vcore	3DMark06	SM2.0	HDR/ SM3.0	CPU	PCMark05	CPU	Memory	Graphics	HDD	F.E.A.R.	Dr. DivX****	WinRAR****
2.66GHz	1.35V	8967	3632	3462	3830	7387	8406	5285	6938	6389	72	4:40	3:23
2.7GHz	1.35V	8989	3629	3470	3881	7456	8518	5342	6936	6403	72	4:39	3:25
2.75GHz	1.35V	9052	3636	3469	4067	7513	8680	5440	7009	6403	72	4:35	3:22
2.8GHz*	1.35V	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2.8GHz*	1.4V	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2.8GHz	1.5V	4930	1829	1783	4120	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2.8GHz	1.6V	9016	3630	3453	4026	7635	8844	5540	7013	6348	72	4:35	3:18
2.85GHz**	1.6V	9081	3636	3468	4168	7727	8979	5647	7034	6411	73	4:22	3:11
2.9GHz	1.6V	9098	3634	3470	4227	7825	9111	5743	7072	6392	71	4:22	3:09
3GHz	1.6V	9130	3636	3470	4336	7860	9385	5948	7031	6365	72	4:03	3:05
3.2GHz	1.6V	9178	3641	3461	4542	8212	9864	6336	7088	6394	72	3:54	2:53
3.4GHz	1.6V	9224	3643	3473	4671	8353	10180	6742	7171	6385	72	3:44	2:44
3.44GHz	1.6V	9233	3637	3475	4723	8355	10367	6825	7183	6375	71	3:39	2:39
3.45GHz***	1.6V	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Games run at 1,600 x 1,200 4X AA/8X AF

* System failed to boot with stock cooling ** Switched to Zalman CNPS9500 *** 3DMark06 crashed ****(minutes:seconds)

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

ATI Radeon X1650 XT



With the Radeon X1650 XT, ATI sets its sights on gamers on a budget. ATI built the X1650 XT around its new 80nm R560 chip, and the card features a 574MHz GPU core clock and 256MB GDDR3 memory clocked at 675MHz.

Compared to the older X1650 Pro, the X1650 XT has three additional vertex shaders (eight instead of five) and twice as many pixel shaders (24 compared to 12) and ROPs (eight instead of four). Those numbers also look impressive stacked against this card's current competition from Nvidia, the GeForce 7600 GT, which features a 560MHz GPU clock, 700MHz memory clock, five vertex shaders, and 12 pixel shaders. And like the X1950 Pro, the X1650 XT features native CrossFire support to make upgrading to a dual-graphics system easier than ever.

In the interests of comparing the X1650 XT to the performance-tier X1950 Pro, I ran the initial tests at 1,600 x 1,200 with ATI's Catalyst 8.301 driver, but only my Far Cry demos were a playable 40fps and 50fps. At a more reasonable 1,280 x 1,024 resolution, the X1650 XT posted decent scores. In CrossFire, the X1650 XT cards scored 30fps in Oblivion's most GPU-crushing environment; a single X1950 Pro only managed 29fps.

With the X1650 XT, Nvidia's GeForce 7600 GT finally has a worthy competitor. But if the X1650 XT is priced much more than $150, it may be too little too late. ▲

by Andrew Leibman

For a full look at the X1650 XT's 1,600 x 1,200, see our chart at www.cpumag.com/cpujan07/x1650xt

Radeon X1650 XT
$149
ATI
www.ati.com
●●●◖

Benchmark Numbers*

	Radeon X1650 XT	Radeon X1650 XT CrossFire	Radeon X1950 Pro	Radeon X1950 Pro CrossFire
3DMark06				
Overall	3009	4714	4789	8164
3DMark06 HDR/SM3.0	1119	1856	1956	3732
Far Cry 1.33				
Training	53.88	81.26	92.84	126.94
Research	64.13	111.29	114.86	184.04
F.E.A.R. 1.07**	29	32	46	53
Quake 4***	26.45	42.03	44.11	75.91
Oblivion (HDR Enabled)				
Outdoor	19.63	30.74	29.68	55.98
Town	27.76	56.01	60.79	64.77
Dungeon	30.7	61.16	67.22	69.24

*All games tested at 1,280 x 1,024 with 4XAA/8XAF enabled
**Soft Shadows disabled ***Dual-core CPU support enabled

Specs: GPU: Radeon X1650 XT; GPU clock: 574MHz; Memory: 256MB GDDR3 (675MHz); 24 pixel shaders; 8 vertex shaders

Plextor PlexEraser

Data is forever, especially if you burn it onto a CD or DVD. Until recently, however, the only sure way to destroy data nestled on an optical disc was to literally shred it. But this process is noisy and messy, and the shards you toss in the trash will eventually ooze their nasty chemicals into the environment.

Plextor's quiet, secure, and eco-friendly solution? The PlexEraser, a clever little box that's solely dedicated to obliterating the data on write-once (CD-R, DVD±R) and rewriteable (CD-RW, DVD±RW) media. Pop in a disc, and the PlexEraser starts swinging its laser like a lightsaber, overwriting data and everything else on the disc, including track and session info and the table of contents. With RW media, you get a scorched-earth approach that wipes all data *and* the media ID and vendor info, rendering the disc unusable.

Installing the PlexEraser is brainless. (It's a good thing, too, because Borat apparently wrote Plextor's manual; it's riddled with typos, errors, and technical misstatements.) Just plug this external drive-sized box into an electrical outlet—no computer needed. It's just as brainless to use: Pop open the disc tray, drop in a disc, close the tray (but be careful; you'll receive no cordial "Are you sure?" warning from the PlexEraser once the tray closes), and wait a few minutes. In my tests, the PlexEraser chewed up a CD-R with 690MB of MP3s, a CD-RW with hundreds of files totaling 489MB, and a DVD+RW with 430K of data, each in about three minutes. (As you might guess, a dual-layer DVD takes about twice as long.) The data format—audio CD, Photo CD, etc.—doesn't matter, and the number or size of files has no effect on overwrite time.

What's not to like? First, the price. Ecological considerations aside, a disc shredder is about a fourth of the cost. Second, Plextor has yet to secure any data disposal certification from the likes of the Department of Defense, FBI, or other federal agencies. (It does meet RoHS 1.2 standards.) Still, the PlexEraser is quiet, fast, and trashes data without trashing the environment. That makes it a pretty darn good buy. ▲

by Robert Luhn

PlexEraser
$249
Plextor
www.plextor.com
●●●◖

Specs: Erases CD-R/RW, DVD±R/RW single and DL discs; 12cm and 8cm round media

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

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Maingear F131

Maingear has a new flagship gaming system that features a customized chassis and a bevy of parts. You can choose from one of two core system types (based on ATI or Nvidia graphics) and fine-tune the rig's specs via the Maingear's online configurator. Maingear sent me its new F131 CrossFire model, which features two ATI Radeon X1950 XTXs and an overclocked Conroe.

Specifications. The highly overclockable 2.93GHz Intel Core 2 Extreme X6800 (overclocked to 3.5GHz) powers this system. Maingear achieved the overclock with some heavy-duty air cooling that includes a Zalman CNPS9500 LED heatsink fan and a nearby 120mm exhaust fan. The two 512MB Connect3D ATI Radeon X1950 XTX GPUs and a 128MB AGEIA PhysX card benefit from another 120mm fan that pulls outside air through a vent in the side panel.

Maingear also managed to squeeze a Creative X-Fi XtremeMusic sound card between the behemoth graphics cards. An Asus P5W DH Deluxe mobo boasts Intel's 975X chipset and two Gigabit LAN ports, integrated 802.11g, and a remote that can control system noise and power settings.

I'm a little surprised that Maingear chose Windows XP Home for a $5,000+ system, but you can add WinXP Pro or Media Center Edition.

Design. Most of the system's interior is extremely clean, but the PSU's main cables snake through one of the two hard drive cages, blocking one of the empty hard drive slots. It's not a major issue, as the system has three other free slots, but I'm surprised Maingear didn't find a way to route the cables around the cage.

Maingear F131

3DMark06	11418
SM2.0	4779
HDR/SM3.0	5267
CPU	3017
PCMark05	8742
CPU	8850
Memory	6980
Graphics	7835
HDD	6959
F.E.A.R.	95
Far Cry Training	181.56
Oblivion	58.8
Quake4	93.72
Dr. DivX*	3:55
WinRAR*	2:38

*(minutes:seconds)

Thanks to the metallic blue paint job, the F131 CrossFire serves better as a stay-at-home PC than a LAN party rig. The chassis paint is nearly mirror-like and extends to the peripherals, which include a Saitek Eclipse keyboard and Logitech's weight-customizable G5 Laser Mouse.

The case itself is a Lian-Li chassis that Maingear has custom-built. I liked the unusually shaped side panel window, but customers who don't put much stock in windows can shave just shy of $100 off the price tag by opting for a regular side panel. I also liked the Maingear logo case badge on the front of the system, which replaces the larger logo that adorned previous Maingear rigs.

Performance. The F131 is a gaming system through and through, but if you also use your computer for multimedia or office tasks, you won't be disappointed. The overclocked system crunched a 500MB file in my WinRAR test in only 2:38 and posted a PCMark05 score of 8742 (with a CPU score of 8850).

The F131 really came into its own in the gaming benchmarks, offering solid scores in the synthetic benchmarks and respectable frame rates in our game tests. For example, it notched a 3DMark06 score of 11418 and the system posted 181fps in Far Cry's Training demo at 1,600 x 1,200 (with 4XAA and 8XAF). I took the system for a spin after it completed the benchmarks. I wasn't surprised to see that it handled older games, such as Far Cry, like a champ, but it also provided realistic dust and flying rubble in F.E.A.R.

Final Word. Maingear plans to shuffle a couple of new products into the mix: By the time you read this, the system will have 1,066MHz Corsair XMS2-8500 DDR2, and a 750W Maingear power supply will replace the standard 600W Maingear PSU.

If you're looking for a system that will kick off the year with style and provide expandability as new parts become available, the F131 isn't a bad choice at all. The case's clean and spacious layout means you can add components without compromising airflow, and the existing parts handle today's games without trouble. Maingear backs up the PC with a one-year warranty; this review unit's price includes a three-year warranty ($190 off the overall price). ▲

by Joshua Gulick

Specs: 2.93GHz Intel Core 2 Extreme X6800 at 3.5GHz; Asus P5W DH Deluxe; 512MB Connect3D ATI Radeon X1950 XTX (x2); 2GB Corsair CM2X1024-6400 DDR2; 150GB Western Digital WD1500ADFD; 500GB Western Digital WD500KS; 128MB AGEIA PhysX; Creative Labs X-Fi XtremeMusic; Plextor PX-760A; WinXP Home

F131
$5,482
Maingear
www.maingear.com
●●●●

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

Logitech diNovo Edge

Logitech recognizes that hardcore gamers' functionality preferences differ from other home users. So even though all of its high-end keyboards are capable of meeting both basic gaming and office needs, individual models lean more towards one user type or the other. The diNovo Edge caters to home users and multimedia enthusiasts who place a premium on style.

The Edge communicates via Bluetooth rather than traditional RF, which gives it a range of about 30 feet. The board includes a USB mini-receiver, but if your notebook also has built-in Bluetooth functionality, you won't need the receiver.

But that's not to say that there aren't any cords in the box: You'll find one for the board's charger. That's right; there are no removable batteries in the diNovo Edge. Logitech says the built-in batteries last for about 60 days on a two-hour charge (one day on a five-minute charge).

Thin is in for diNovo keyboards, and the Edge stands a mere 11mm off the desk. A piano black finish and a brushed aluminum wrist rest add to the board's already sleek appearance.

I've seen some near-worthless touchpads on keyboards, so I was skeptical about the TouchDisc, which sits where you would expect to find a number pad. (This board's only number keys are above the character keys.) However, the TouchDisc is the real deal. The mouse cursor reacted quickly to my finger movements, and I like the TouchDisc's vertical and horizontal scrolling capabilities. The volume slider also is touch-sensitive.

Although the left side of the keyboard sports a few buttons, including some handy Zoom buttons, Logitech keeps the board uncluttered by hiding the function keys' extra commands. Press the FN key to access the board's media and application commands, and orange LED icons light up near the function keys.

Logitech didn't forget that the Edge is still just a keyboard. It paid attention to key resistance and created a set of keys that type crisply and quietly. The Edge carries a heavy price tag, but it's a great multimedia keyboard. ▲

by Joshua Gulick

Specs: Bluetooth; charging base; TouchDisc touchpad; volume and media controls

diNovo Edge
$199.99
Logitech
www.logitech.com
●●●●◖

Village Tronic VTBook

In most situations, you'd need a crowbar to separate notebook users from their prized portables. But it's an entirely different story when that notebook is sitting on a desk. If you've ever tried any multiwindow multitasking on your notebook, then you've probably had the urge to use that same crowbar to see what color your notebook LCD bleeds.

Village Tronic's VTBook notebook multiple display card can end your limited screen-area frustrations by letting you connect an external VGA or DVI monitor to your notebook. (It also supports HDMI through an adapter, but not HDCP.) And if you have two PC Card slots, two VTBook cards, and two Dual-Display cables (sold separately), you can connect up to four external monitors. The package I tested included a single VTBook card with a built-in DVI-I connector, DVI-to-VGA adapter, software disc, and carrying case.

The VTBook utilizes a PC Card Type II interface and is fully hot-swappable in Windows XP. The unit supports more than 130 resolutions, and that number grows if you have a DDC2B (Display Data Channel Level 2B)-complaint monitor, which reports the graphics modes that the monitor is capable of displaying to the VTBook.

According to Village Tronic, the VTBook supports a maximum DVI resolution of 1,920 x 1,200 and a maximum VGA resolution of 2,048 x 1,280. Despite this claim, my 30-inch Dell 3007WFP, which natively supports 2,560 x 1,600, maxed out at a comparably miniscule 1,280 x 768. The Dell monitor requires a dual-link-capable graphics card to support its maximum resolution, and neither VTBook nor the integrated graphics of my notebook were dual-link-capable. Using a non-dual-link monitor, the IBM ThinkVision L200p, the VTBook was able to extend my Desktop using the monitor's native 1,600 x 1,200 resolution.

Other than the lack of dual-link support, the VTBook is a great—if somewhat pricy—way for dedicated notebook users to expand their horizons. ▲

by Andrew Leibman

Specs: PC Card Type II interface; 32MB 266MHz DDR memory; DVI-I port; DVI-to-VGA adapter

VTBook
$249
Village Tronic
www.villagetronic.com
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CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

Anand's Corner

by Anand Lal Shimpi

Yet Another AMD-Intel Update, This Time For '07

Although it got off to a slow start, 2006 has been an extremely interesting year; the release of Intel's Core 2 processors and Nvidia's G80 made for a lively second half. The year's industry news was nothing short of fascinating, obviously capped off by AMD's announcement that it would acquire ATI. We have yet to see what impact this will have on the industry as a whole, but I suspect we'll start to see signs in 2007. For now, it's time to do one of those year-end looks ahead at what's coming from the two big players in the CPU industry. Seeing as how AMD is in a position where it needs to play catch-up now, I'll start there first.

The two code names to keep in mind from AMD are Agena and Kuma. Both will be based on AMD's next-generation microarchitecture (built on a 65nm SOI process) and are expected to ship sometime in Q3 of next year.

Agena is the quad-core offering, with clock speeds ranging from 2.7 to 2.9GHz and sporting a 512KB L2 cache for each core. To allow for better performance in multithreaded applications where data sharing among the cores is crucial, Agena will have a single 2MB L3 cache that is available to all four cores.

Kuma is the more affordable dual-core version of Agena and will be available in 2.0 to 2.9GHz flavors. Each of the two cores will feature a 512KB L2 cache, and just like Agena, there's a shared 2MB on-die L3 cache to help reduce traffic on the memory bus. By keeping a single copy of data that both cores need, AMD will make efficient use of its L3 cache space.

Both Agena and Kuma are listed as Socket AM2+ parts with support for a HyperTransport interface that is twice as fast as AMD's current offerings.

What about between now and Q3 '07? By Q1 '07, AMD will begin shipping its first 65nm parts, code-named Brisbane, Lima, and Sparta (Athlon 64 X2, Athlon 64, and Sempron, respectively). These 65nm chips will simply be die-shrunk versions of the current 90nm AMD chips and receive no additional functionality. The move to 65nm will allow for higher clock speeds and thus we will see an Athlon 64 X2 running at 2.8GHz and 3GHz.

The move to 65nm will also reduce AMD's die size, allowing AMD to reintroduce 1MB L2 cache per core X2 parts, which you may remember were mostly phased out earlier this year. What we will then see is an Athlon 64 X2 5400+ running at 2.8GHz with 512KB L2 per core, followed by a 5600+ (2.8GHz) with 1MB L2 per core, then a 5800+ at 3GHz and 512KB L2 per core, and finally a 6000+ running at 3GHz but with 1MB L2 per core.

Unfortunately for AMD, as we've seen with currently shipping Athlon 64 X2s, a clock speed bump to 3GHz isn't going to be enough to dethrone Intel's Core 2 processors, but AMD may be able to compete with aggressive pricing. While AMD will be making the move to 65nm in '07, Intel will be refreshing its Core 2 lineup with support for the 1,333MHz FSB. An increase in FSB frequency will boost performance a bit, but don't expect anything more than single-digit performance gains from it alone. Alongside the faster FSB frequency, Intel will be introducing a Core 2 Duo E6850 at 3GHz and some other minor speed grade changes to work with the new 1,333MHz FSB.

Fortunately for AMD, these updates to Core 2 won't come along until Q3 of next year, which means that we probably won't see Intel's performance change much at all for the next year. What this means for AMD is that it will have ample time to narrow the performance gap before Intel strikes once more with an updated microarchitecture in 2008. ▲

Talk back to Anand at anand@cpumag.com.

Anand Lal Shimpi has turned a fledgling personal page on GeoCities.com into one of the world's most visited and trusted PC hardware sites. Anand started his site in 1997 at just 14 years old and has since been featured in USA Today*, CBS' "48 Hours" and* Fortune*. His site—www.anandtech.com—receives more than 55 million page views and is read by more than 2 million readers per month.*

> The move to 65nm will also reduce AMD's die size, allowing AMD to reintroduce 1MB L2 cache per core X2 parts . . .

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The Shark Tank

ATI's Mainstream X1600 XT

by Alex "Sharky" Ross

Disrupting Reuters' newswire with a cheery Christmas greeting at age six, Alex "Sharky" Ross became an avid computer user/abuser, eventually founding popular hardware testing/review Web site SharkyExtreme.com. Exposing shoddy manufacturing practices and rubbish-spouting marketing weasels while championing innovative products, illuminating new technology, and pioneering real-world testing methods was just a front for playing with the best toys. The site acquired, he left in 2001. A London native and London School of Economics graduate, Alex currently overclocks/tunes Porsche 996 Turbos with www.sharkwerks.com when he's not tweaking PCs.

It's been a rocky road for ATI as of late, with only the AMD merger and the subsequent injection of cash providing any real positives. On the product side, there have been some recent promises that haven't been kept in terms of release dates and suggested pricing. Furthermore, Nvidia continues to dominate the graphics market in terms of performance, delivery, and execution. So it's somewhat of a pleasant surprise to see some real fire left in ATI with the release of the Radeon X1650 XT graphics card targeted at the midrange sector, which has proven to be an uncomfortable arena in the past. The previous X1600 XT was a rather tame effort.

The X1650 gets rid of the old RV530 chip and uses a newer RV560 chip instead, which is actually the first chip ATI used in the higher-end X1950 Pro. Based on TSMC's 80nm process, this chip is not only smaller, but it runs cooler, too. This is the first clue that the Radeon X1650 XT has something good under the hood.

The X1650 XT also has double the pixel pipelines in comparison to the outgoing X1600 series (up from 12 to 24), along with eight vertex shaders and eight texture units. And now, finally, ATI uses internal bridges for CrossFire compatibility with the X1650 XT. The GPU clock is set to a slightly lower frequency at 575MHz, but this doesn't harm performance if you consider the efficiency of the new silicone over the outgoing silicone. The memory interface is only 128-bit, but this is standard fare at the mainstream level. I would obviously like 256-bit memory interface, but that would drive costs upward into X1950 territory. ATI clocks the 256MB of GDDR3 RAM to a healthy 675MHz, so it's not like bandwidth (up to 21.6GBps) is a real problem anyway.

The physical size of the card is rather diminutive, so it will fit in any SFF case nicely. Also, the single-slot, copper-based cooler is low-profile and doesn't get in the way. (And it's quiet.) The two dual-link DVI connectors sport full HDCP support—big whoop—but when pairing up two X1650 XT's with internal CrossFire connectors, I found that driving the higher-resolution larger displays worked great. (For example, the 42- and 47-inch Westinghouse 1080p LCDs I wrote about last month [see page 33 in the Dec. 2006 *CPU*].) The "native" CrossFire support in the X1650 XT means that you no longer have to use that clunky external dongle or worry about master and/or slave cards. It was about time ATI put that whole episode to bed anyway.

Make no mistake, the X1650 XT is no dud but rather a welcome addition to the current mainstream market. It actually competes very well alongside Nvidia's more expensive (about $220) 7600 GT and is perfect for a 1,280 x 1,024 resolution. In 3DMark06 the X1650 XT came in at 3275 compared to the Nvidia 7600 GT's 3414. More importantly, though, in Half-Life 2: Episode 1 the X1650 at 42fps was slightly ahead of the 7600 GT at 40fps. In Far Cry the two competitors were almost neck and neck, as well, at 54fps for the X1650 XT and 51fps for the 7600 GT.

Even though we all want the very top-end gear, not everyone can afford it. At $150—assuming you can find it for that price—a 3D card with enough punch to tackle most of today's games is just what the doctor ordered. Ultimately, I really had my hopes up for this card, but it seems that ATI's OEM board partners are indicating that the $150 price point is going to be a very tough one to hit. Watching ATI "play" in the 3D graphics market can, in some ways, be akin to being an Oakland Raiders fan. Just when the team gets things going and looks like it is coming up with a good drive, it ends up getting penalized by being its own worst enemy and undoing a bunch of good work. If prices get into the $190 to $200 range, then recommending this board over a faster GeForce 7900 GS would make no sense. One can only hope that the X1650 XT is not just another paper or false release. ▲

> Make no mistake, the X1650 XT is no dud but rather a welcome addition to the current mainstream market.

Email me at sharky@cpumag.com

PC Modder

Tips & Tutorials

Modding does the body good. A PC's body anyway, inside and out. Here you'll find hardware, firmware, tools, tips, and tutorials for modding your rig's performance and appearance. Send us your own mod-related tips and ideas at modding@cpumag.com.

Modding enthusiasts have a penchant for the latest toys. Fast processors, powerful video cards, silent SFF enclosures, and radically lit motherboards are all fair game when it comes to a modder's creative mind. Recognizing the appeal of unconventional customization, an entire industry has emerged to support the community.

Mods & Ends

Zalman Fatal1ty FC-ZE1

Zalman, well-known for its line of silent PC cooling products, has hooked up with decorated FPS gamer Johnathan "Fatal1ty" Wendel to introduce the slick FC-ZE1 ATX midtower gamer's case.

The Zalman Fatal1ty FC-ZE1 minimizes noise by using thick, aluminum panels that prevent vibration amplification.

The Fatal1ty FC-ZE1 ($359) has an aluminum body and features 5mm thick, black anodized panels that prevent vibration amplification and aid in overall system cooling. Zalman also outfitted the case with two quiet, 92mm lighted front intake fans and a single 120mm lighted rear exhaust fan. In addition to the heavy-duty construction and silent fans, the FC-ZE1 features laser-etched graphics, a windowed side panel, a tool-free hard drive chassis, and an assortment of handy front-mounted connectors for USB, FireWire, and speakers/headphones.

Thermaltake Toughpower 750W

Although CPU and GPU manufacturers have gone to great lengths to improve the power efficiency of their products, today's high-end processors and video cards still require massive amounts of power. And to ensure stability and longevity, a steady stream of power is necessary.

To capitalize on the demand for high-quality, affordable power supplies, Thermaltake recently augmented its Toughpower series of module PSUs with 750W models that are SLI- and CrossFire-certified. The new Toughpower 750W ($189) features two 6-pin PCI Express power connectors and four +12V rails that can supply an impressive 60A combined current. That's plenty of juice for all but the most demanding multi-GPU rigs.

With modular cables and a polished, mirror-effect housing, the Toughpower 750W unit not only delivers ample power but also looks good. Other notable features include Active PFC, up to 85% efficiency, and low-noise 14cm fans that produce only 16dBA at 1,300rpm.

Thermaltake's Toughpower series of power supplies are ready for SLI, CrossFire, and quad-core CPUs.

Razer Armadillo

How many times have you found yourself in the heat of battle, and—BANG!—you're dead because you caught your mouse cable on something and couldn't get out of the line of fire in time? It happens a lot; we know from experience.

Keep that pesky mouse cord where you want it with Razer's Armadillo.

To help alleviate this problem, the folks at Razer have introduced the Armadillo mouse cable management system. In essence, the Razer Armadillo ($19.99) is a weighted lazy Susan of sorts that secures a mouse cable and can quickly swivel 360 degrees. It's constructed of carbon-coated steel and weighs in at nearly half a pound, so it will last and stay put—simple, yet effective. Finally, you can quit tugging and readjusting your mouse cable during those fast-paced fragfests.

Fashionably Fresh Firmware

Nikon D2X (v2.0)

The latest update for Nikon's D2X family of digital cameras resolves a multitude of issues and adds new functionality such as additional ISO settings, autofocus improvements, and changes to menu and image processing options.

www.nikon.com

Matsushita DVD-RAM UJ-850 (v1.01)

An update for the Matsushita DVD-RAM UJ-850 optimizes the write process when burning DVD+R DL discs at 4X speed and adds support for various 8cm DVD+R DL media.

www.panasonic.com

Ricoh Caplio R5 (v1.42)

A recent firmware update for the Caplio R5 digicam boosts the stability of writing data to an SD card and bolsters the camera's AWB (auto white balance) accuracy.

www.ricoh.com

by Marco Chiapetta

Blistering Broadband

Modding A Cable Connection For Maximum Performance

Broadband is definitely where it's at in terms of performance. But just like virtually every PC-related technology, there are tweaks and procedures to follow that can enhance a broadband connection and fundamen-tally improve an online experience. There are a number of ways to tweak cable broadband connections in particular to improve performance and reliability. For example, the types of cables you use, the number of times the line splits, and even your router or Windows' network configuration can affect the ultimate speed of a broadband connection.

Necessity Is The Mother Of Invention

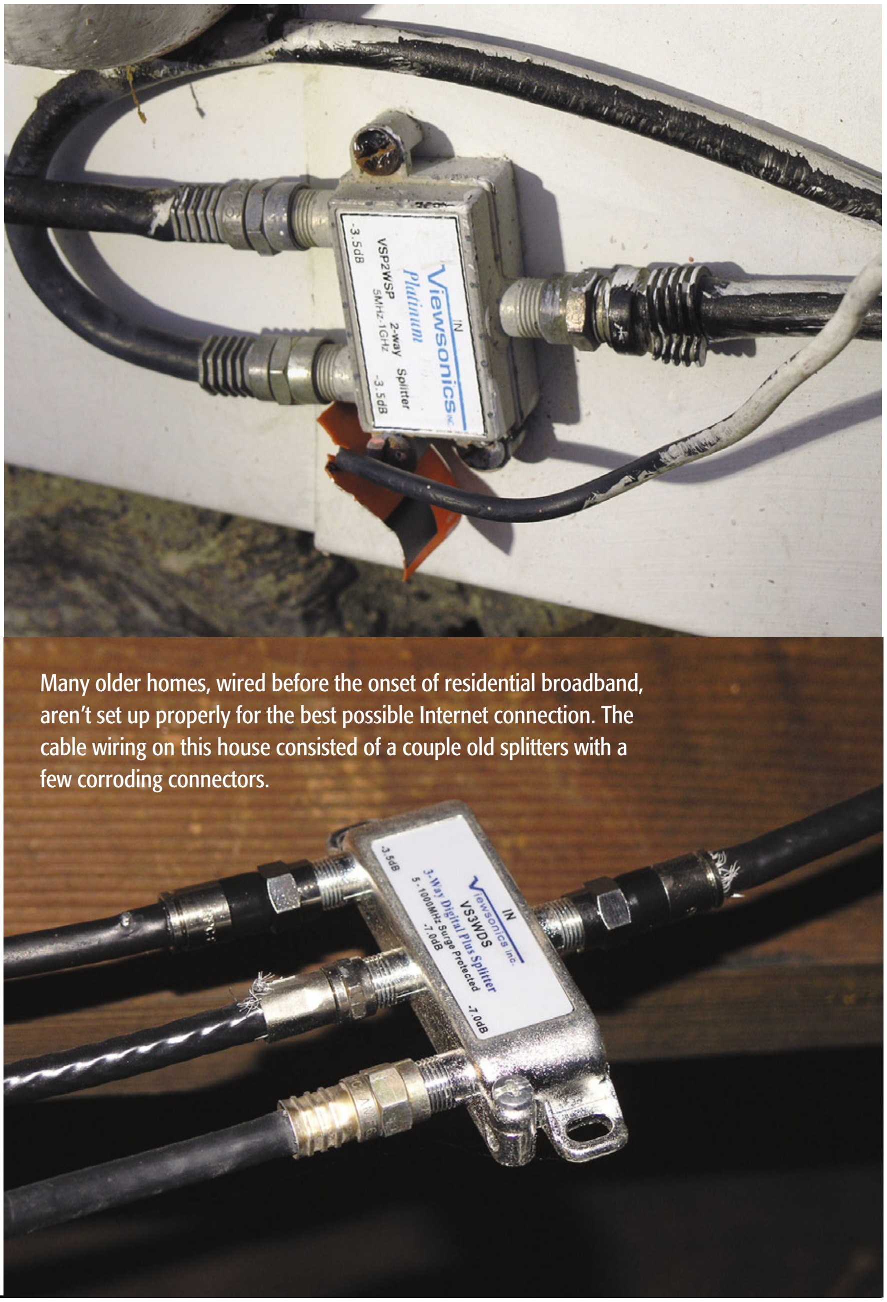
After moving into a new home recently, I found out just how finicky a cable connection could be. The house I moved into was relatively old and consequently wired only with cable TV in mind; the wiring predated the Internet, let alone high-speed connections to the Web.

Plus, over the years, the previous homeowners had made some changes and additions to the cable circuitry in and around the house; these changes made the cable connection relatively unreliable, both in terms of stability and performance.

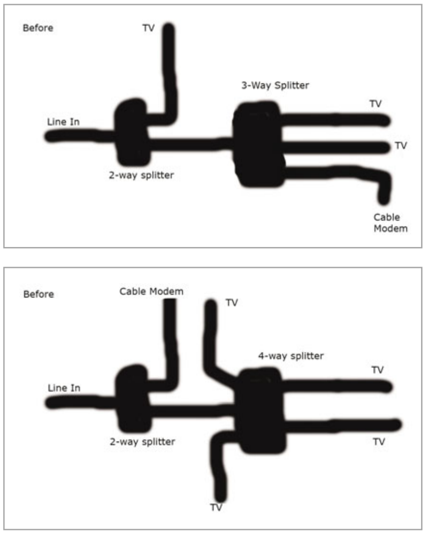
For a cable connection to remain stable and perform well, the modem must receive a strong signal from the main cable line. The more splits in the line, the longer the cable runs, the quality of the connections and splitters, and the condition of the cable sheathing will all impact the quality of the signal that the modem receives. Thankfully, once the main cable line connects to your home from the source, it's not too difficult to change the wiring configuration for optimal performance.

The "Hardware" Mods

When I moved in, the house's cable wiring was set up so that the modem was connected to the feed after the main line had already split multiple times. The main line came to the outside of the home and fed into a two-way splitter. One line from that splitter ran to the second floor of the house, and the other ran into the basement. The basement line then connected to a three-way splitter, which fed



Many older homes, wired before the onset of residential broadband, aren't set up properly for the best possible Internet connection. The cable wiring on this house consisted of a couple old splitters with a few corroding connectors.



For maximum performance, a cable modem should be connected to the cable line on the first split in the main feed coming from the pole. The further down the chain, the worse performance will be. Before I rewired this house, the modem was connected after the main line had already split five times.

into multiple rooms on the first floor. The modem connected to one of the lines coming from the three-way splitter. Because it was far down the chain of connections, the modem was forced to work with a degraded signal; every split in the line reduces the signal strength by a certain degree.

I also had to contend with the quality of some of the cables and cable connectors. A couple of the cables in the basement had frayed ends and cracked sheathing, which exposed some parts of the shielding underneath. When it's frayed and sticking out from the end of the connector, exposed cabled shielding can act like a mini-antenna, causing it to pick up and introduce RF interference to the cable signal. The connectors on the outside of the home had begun to rot and corrode after many years of exposure to the elements. I had to fix these physical defects and reconfigure the cable lines running through the home to give the cable modem the best possible signal.

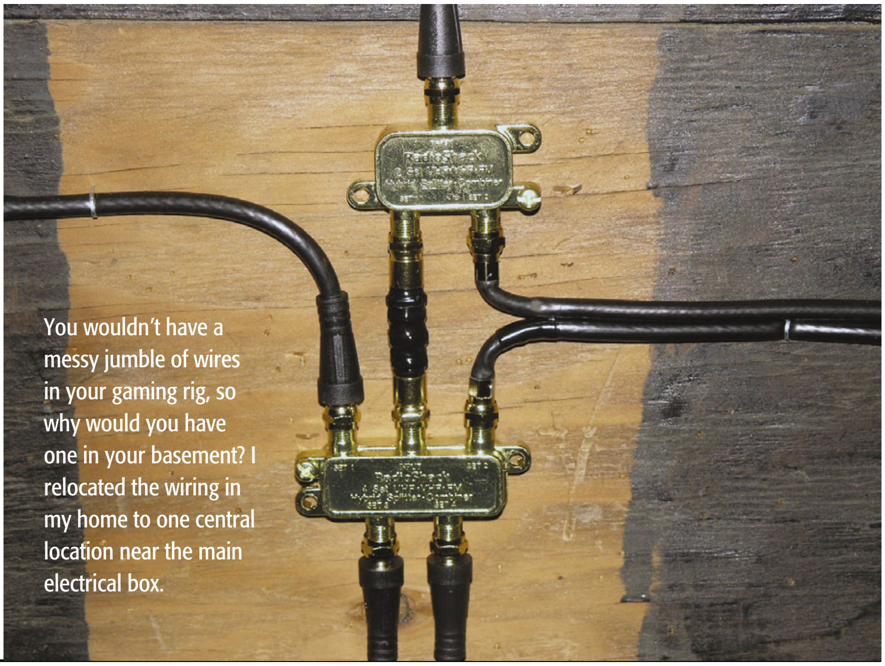
I began by disconnecting all of the cables, discarding the older two- and three-way splitters, and using new splitters in their place. I replaced the outdoor two-way splitter with a coax coupler and grounding block combination, which I grounded to a drain pipe right in the vicinity. It's important to ground your cable line to dissipate voltage spikes, like those caused by a nearby lighting strike. I added another coupler to extend the length of the cable that fed the second floor of the home, so I could feed into the basement and route it from a central location. I cut off any corroded connectors and replaced them with fresh ones.

At this point, the main cable line was feeding into the basement, along with another line that led all the way up to the second floor. I routed those to a central location and began work on the remaining cables and connectors in the basement. There wasn't enough slack in the cables feeding the first floor of the house to reach my desired locations, so I replaced them all with brand new, RG-6 quad-shielded cables purchased at a local electronics store. You can find good-quality, 75-ohm, quad-shielded cables in 25-foot and 50-foot lengths for about $20 to $40, so it was worth replacing the older cables that were easy to route up to the first floor from the basement.

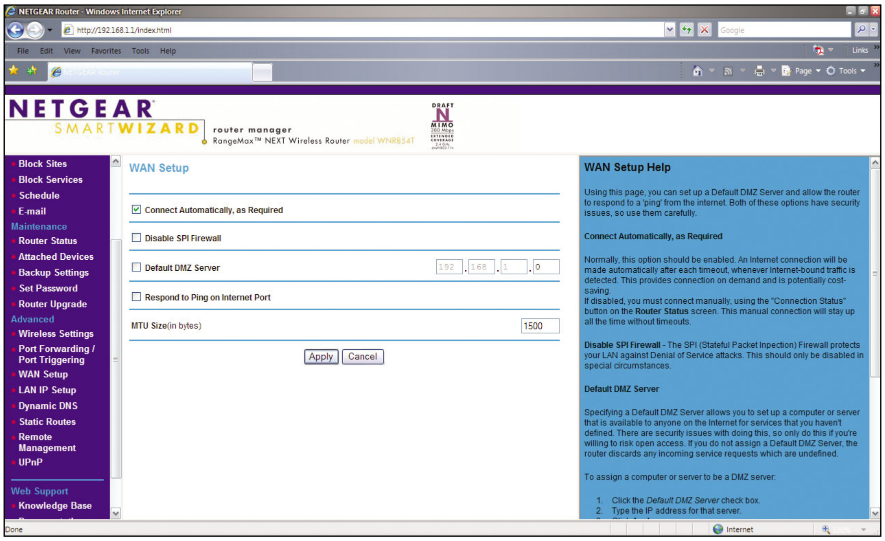
With all of the cables routed to a more accessible central location in the basement, I began to make all of the connections. First, I connected the main cable line to a new two-way splitter and linked the leads from the two-way splitter to the cable feeding the modem and another short cable that fed into a new four-way splitter. I used the four-way splitter solely for my televisions on the first and second floors. Leads on the four-way splitter were then connected to the remaining cables, which fed the second floor and the rest of the television cables on the first floor. Connecting the cables in this manner meant the modem received the best possible signal, because it was being fed off the very first split in the main line.

The Software Mods

Once I had properly connected the new cables, splitters, and other hardware, I turned my attention to the other components that connect to the modem—the broadband router and my NIC. Adjusting some key settings in a router's configuration utility can have a measurable impact on performance. A particularly important setting is the MTU (Maximum Transfer Unit). MTU determines the largest size packet or frame that can be sent in a packet- or frame-based network. The Internet's TCP uses the MTU to determine the maximum size of each packet in any transmission. Large MTU sizes may result in retransmissions if the packet encounters a router that can't handle the large packet. Conversely, small MTU



You wouldn't have a messy jumble of wires in your gaming rig, so why would you have one in your basement? I relocated the wiring in my home to one central location near the main electrical box.



WAN Setup

☑ Connect Automatically, as Required

☐ Disable SPI Firewall

☐ Default DMZ Server 192 . 168 . 1 . 0

☐ Respond to Ping on Internet Port

MTU Size(in bytes) 1500

WAN Setup Help

Using this page, you can set up a Default DMZ Server and allow the router to respond to a 'ping' from the internet. Both of these options have security issues, so use them carefully.

Connect Automatically, as Required

Normally, this option should be enabled. An Internet connection will be made automatically after each timeout, whenever Internet-bound traffic is detected. This provides connection on demand and is potentially cost-saving.
If disabled, you must connect manually, using the "Connection Status" button on the **Router Status** screen. This manual connection will stay up all the time without timeouts.

Disable SPI Firewall - The SPI (Stateful Packet Inpection) Firewall protects your LAN against Denial of Service attacks. This should only be disabled in special circumstances.

Default DMZ Server

Specifying a Default DMZ Server allows you to set up a computer or server that is available to anyone on the Internet for services that you haven't defined. There are security issues with doing this, so only do this if you're willing to risk open access. If you do not assign a Default DMZ Server, the router discards any incoming service requests which are undefined.

To assign a computer or server to be a DMZ server:

1. Click the *Default DMZ Server* check box.
2. Type the IP address for that server.

If you use a broadband router, it too must be configured to maximize the performance of you broadband connection. The most pertinent settings are typically located in the WAN Setup menu.

sizes could result in more header overhead and fragmentation.

Unfortunately, there is no universal MTU size for all ISPs. For most cable providers, an MTU of 1500 is optimal, but we recommend checking with your ISP before making any changes. We also suggest checking out sites such as Broadband Reports.com or SpeedGuide.net for specific tweaks. These sites are a valuable resource and have a multitude of information regarding specific tweaks for just about every major ISP. BroadbandReports.com even has some easy-to-use speed tests and an online tweak test that will help you quickly determine values for some key tweakable settings.

My ISP is Optimum Online (www.optonline.com). Based on the information gleaned from other users and BroadbandReports.com's tweak test, an MTU of 1500 was right for my setup. I first logged into my router, accessed the Advanced WAN setup menu, and made sure the value for MTU was set properly.

Next, I turned my attention to my OS and NIC. By default, Windows' network stack is not optimized for broadband Internet connections. There are a few Registry settings you can alter to tune your system for the best performance with a particular ISP. We've already mentioned MTU, but RWIN (TCP Receive Window) and Path MTU Discovery are also relevant.. The RWIN value determines the amount of data that a system can receive without sending an acknowledgement to the sender. If RWIN is too small, less data can be received before unnecessary overhead is introduced, but an RWIN value too big could result in packet loss and retransmissions. For my ISP, RWIN values of 64240, 128480, or 256960 seem to offer the best performance for connections that are 10mb, 10 to 20mb, and over 20mb, respectively. But once again, there are no universal values; your ISP and others who have successfully tweaked their rigs should be your most reliable source of information. And remember to enable Path MTU Discovery to ensure your NIC uses the MTU value you specify.

To alter the specific Registry settings, I used a program called DrTCP, which is available as a free download at BroadBandreports.com (www.dslreports.com/drtcp). You could manually edit the necessary Registry keys, but they are scattered throughout the HKEY_LOCAL_MACHINE\SYSTEM\CURRENTCONTROLSET\SERVICES\ folder and have cryptic names. For my system, I simply launched DrTCP and set the TCP Receive Window to 64240. Then I set the Path MTU Discovery to Yes. Next I selected my NIC from the Adapter Settings drop-down list and set the MTU value to 1500. Then I clicked the Save button, exited the program, and rebooted my system to make the changes take effect.

Success!

After making all of the changes, I tested the performance of my connection and compared them to results I had saved before modifying any of the cables or settings. My connection speed went from 4.1Mbps download/1.5Mbps upload to 11.33Mbps down/1.9Mbps up—huge increases to say the least. Not only that, but the connection hasn't gone down since I made the changes. Of course, your mileage will vary depending on the quality of your connection when you start; but at the very least, if you're using a broadband connection and haven't tweaked it for maximum performance, you're doing yourself a disservice. Even if your wiring is perfect, you can still likely make gains by tweaking your router and NIC. ▲

by Marco Chiappetta

Parts List

The parts I needed to perform the modifications are relatively inexpensive and easy to obtain. Any local home center or electronics store should have all of the cables, splitters, and connectors readily available, and the software I used to tweak the Windows Registry is free and easy to find. A good place to start is BroadbandReports.com (formerly dslreports.com). There is a multitude of information available for tweaking virtually every major ISP.

25-foot quad-shield coaxial cable:	$79.96 ($19.99 x 4)
Gold four-way cable splitter:	$17.99
Gold two-way cable splitter:	$7.99
F-type cable connectors (5):	$2.99
Gold female/female F-type coupler:	$4.58 ($2.29 x 2)
Gold male/male F-type adapter:	$8.98 ($4.49 x 2)
Outdoor F-type grounding block:	$1.99
DrTCP:	Free
Total:	**$124.48**

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Mad Reader MOD

HP-Resurrection Server

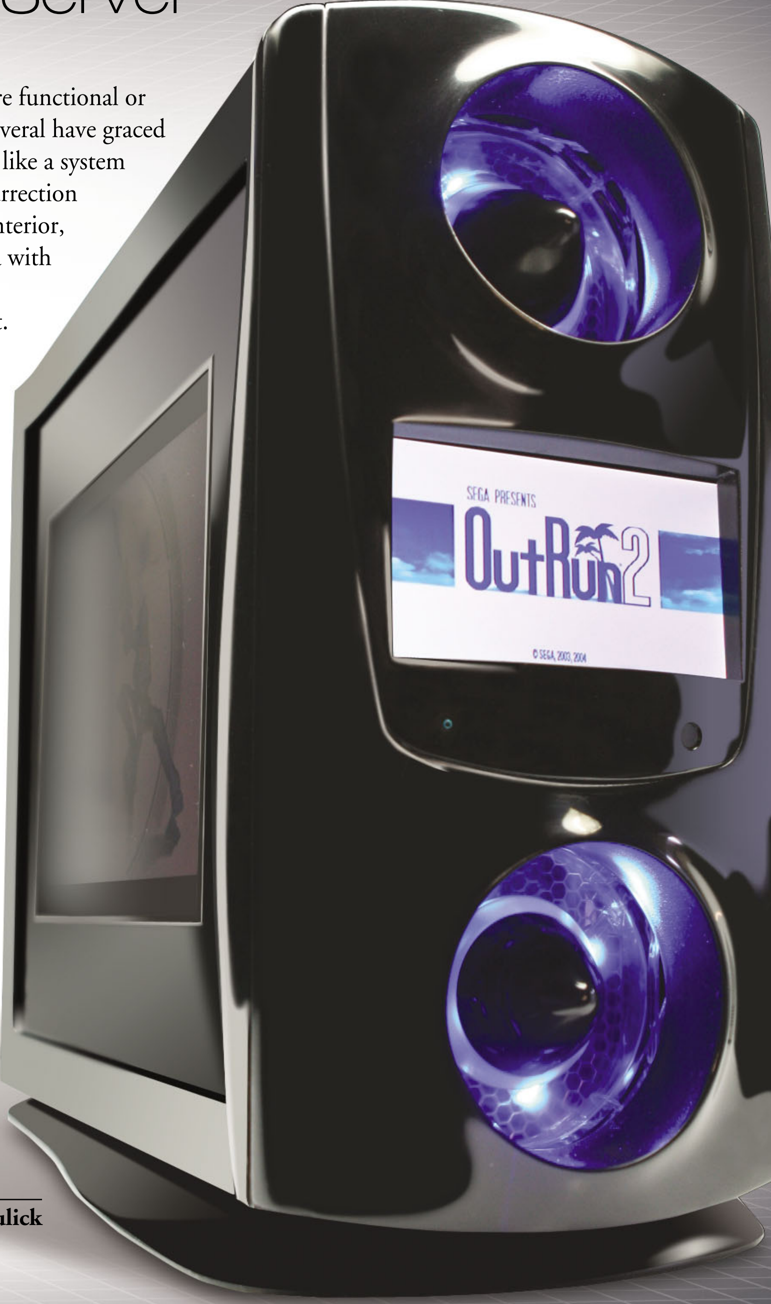
Many modded systems are cooler than they are functional or vice versa. We certainly appreciate them (several have graced our cover), but few mods make our eyes glaze over like a system that strikes a balance. HPRES-SERVER (HP-Resurrection Server), which has a stunning exterior and a cool interior, covers both bases and even tosses in some nostalgia with an HP Pavilion case that hearkens back to the days when Intel Pentium II processors had the limelight.

Luke "Defyant" St. Clair, who hails from Australia, built HPRES-SERVER to handle his family's home server needs. At the moment, the midsized chassis easily cools three 200GB Western Digital WD200JD and three 250GB Seagate Barracuda ST3250 hard drives, thanks to several fan mods. St. Clair expects the system to take on two more hard drives in the future.

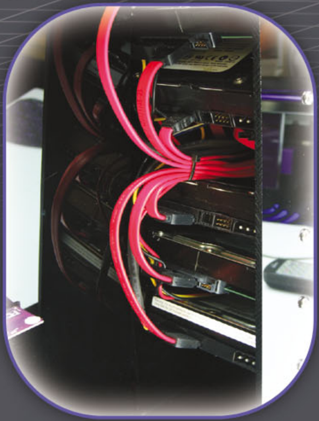
Two separate monitors on the outside of the case add a serious "wow" factor. The 15-inch side panel display caught our attention right away, but the smaller, front panel LCD has a neat twist: Because it was an in-car LCD in another life, the display supports a remote control. "Power for the main screen is supplied via the LCD's original PSU unit and ducted in through the back of the case," says St. Clair. "The front screen power is supplied via the case's own 12V 500W PSU."

Interestingly enough, HPRES-SERVER isn't St. Clair's first HP Pavilion-based mod. In fact, it's the fifth system in a six-computer series. "The vision for HP-6 will be a massive job and will look like three massive jet turbine engines stacked on top of each other," says St. Clair. ▲

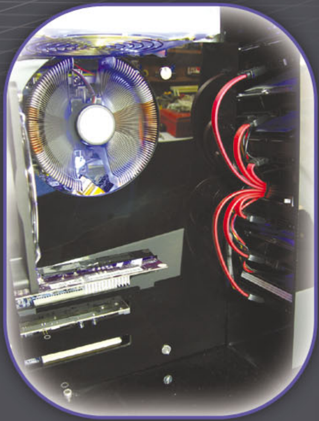
by Joshua Gulick



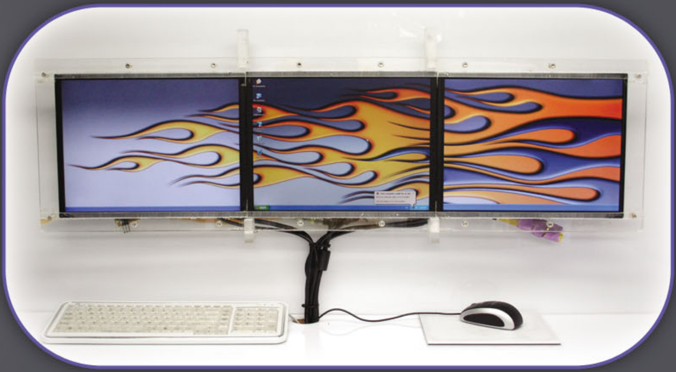
Believe it or not, St. Clair has four more systems based on this old HP Pavilion 8000 series case, and he intends to mod a sixth. Each system has its own personality and purpose.



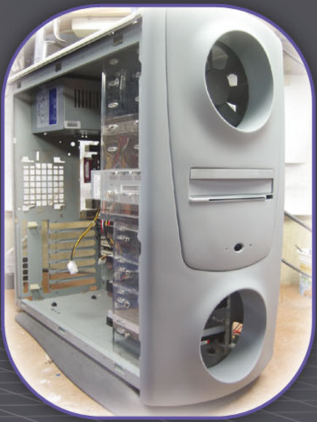
The custom-built hard drive stand angles the drives, creating an unusual look and letting St. Clair easily route the cables together.



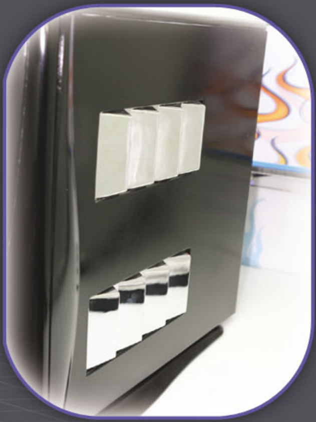
Tinted acrylic hides the motherboard from view. St. Clair tells us that the system's fans force air under this cover and across the motherboard.



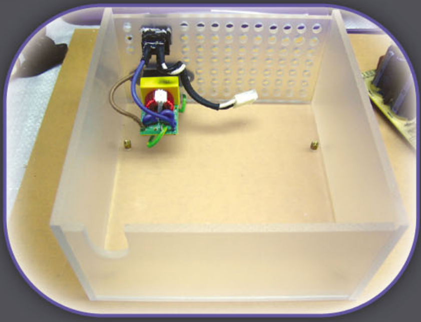
This jaw-dropping workbench features an extra-wide monitor, thanks to three 15-inch displays. St. Clair removed the displays from their original enclosures and built a new frame.

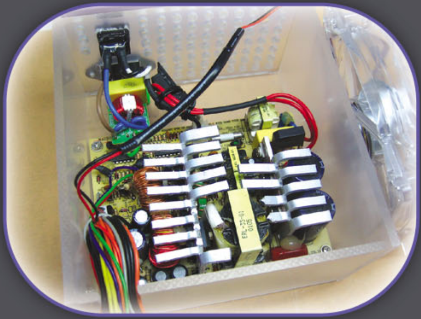


The front panel originally included a custom DVD drive door, but St. Clair removed it in favor of the small LCD that graces the finished system.

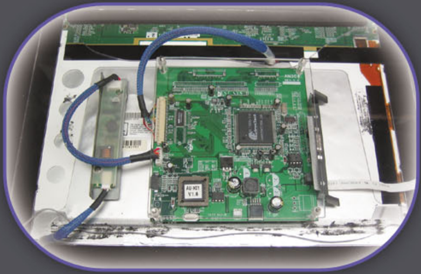


There's no need to build custom parts when a manufacturer already does a fine job, so St. Clair bought these vents from a store that sells auto accessories.





Even the 500W PSU has a custom case. "I measured up the panels and had them cut to size," says St. Clair. "I drilled all the small holes on a drill press and then glued the unit and bolted in the components."



St. Clair dismantled a 15-inch monitor to mod the side panel. "The 6mm-thick, tinted-black window (70% tint) was laser cut to allow the LCD to sit perfectly," says St. Clair. "I chose 6mm as that's the exact thickness of the LCD panel."

Give Us Your Mod

Have a computer mod that will bring tears to our eyes? Email photos and a description to madreadermod@cpumag.com. We're looking for rigs that are recognizable as PCs; your Wookiee mod won't find a home here. If we include your system in our "Mad Reader Mod" section, we'll help you load up your modder's toolbox with $1,500 and a one-year subscription to *CPU*.

advanced Q&A corner

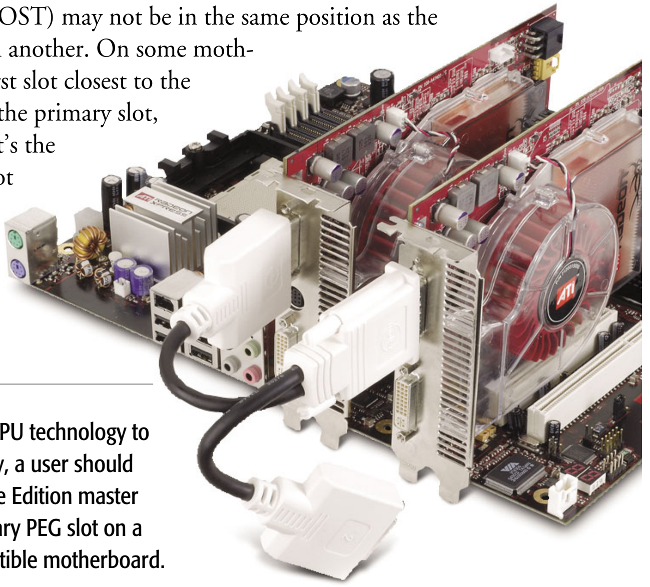
Get informed answers to your advanced technical questions from *CPU*. Send your questions along with a phone and/or fax number, so we can call you if necessary, to q&a@cpumag.com. Please include all pertinent system information.

> “The one area that AMD has struggled with in the desktop and mobile markets is having a ‘total solution’ to complement its processor offering.”

Each month we dig deep into the mailbag here at CPU *in an effort to answer your most pressing technical questions. Want some advice on your next purchase or upgrade? Have a ghost in your machine? Are BSODs making your life miserable?* CPU*’s “Advanced Q&A Corner” is here for you.*

Jeff R. asked: I’m having a problem trying to get CrossFire to work on my system. I already had a Radeon X850 XT Platinum Edition card, and I snagged an X850 master card on eBay. I figured I’d run the two cards together for a while until I have to upgrade to DX10 cards. The rest of my system consists of a Gigabyte GA-G1975x motherboard, 2GB Corsair RAM, a Pentium Extreme Edition 965, a couple of DVD drives, and a pair of Hitachi HDs. I also have a fairly new Enermax 600W power supply, so that should be good. What’s happening is that when I install the master card and then connect my monitor to the port on the end of the dongle, I don’t get any video. I’ve tried connecting my monitor directly to the master card, and that doesn’t work either. If I connect the monitor to the slave card, I can get video, but I can’t enable CrossFire in Windows even though it seems like the drivers are installed OK. I called Gigabyte’s technical support line, and the tech suggested I install the latest drivers for my chipset and video cards and then flash my motherboard’s BIOS. I tried all that, but it’s still not working.

A: We have a pretty good idea what is going on here. It sounds like your motherboard is initializing the standard card first when you power on your system. Setting up a CrossFire rig can be a little tricky because the PCI Express graphics slot designated as the “primary” slot on one motherboard (the slot that gets initialized first after the POST) may not be in the same position as the primary slot on another. On some motherboards the first slot closest to the CPU socket is the primary slot, but on others it’s the second PEG slot that’s further away. Several motherboards also let you change



For ATI’s multi-GPU technology to function properly, a user should install a CrossFire Edition master card in the primary PEG slot on a CrossFire-compatible motherboard.

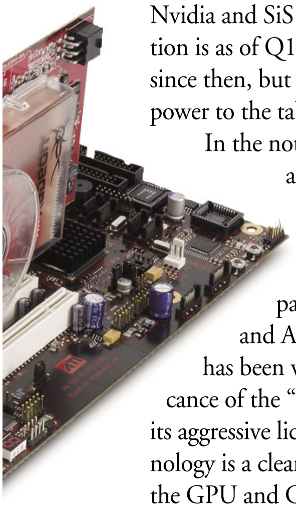
the initialization order via the system BIOS. Also, the CrossFire Edition master card has to be in the primary slot for it to function properly in CrossFire mode.

We suspect all you did was install your new master card into the available slot on your board and gave it a shot. What you probably needed to do, however, was switch the position of your master and slave cards. So go ahead and switch the position of the master and slave cards in the motherboard and then make sure to properly connect the external dongle. It would also be a good idea to check for bent pins in your dongle. The early connectors for the X850 master cards have a dense array of very fine pins that can bend easily. If you have bent pins, it's not likely that you will get a video signal. Lastly, connect your monitor again and see what happens. If none of your components are defective, everything should work fine.

Josh B. asked: I've heard all of the buzz about AMD's acquisition of ATI and what it might mean to the graphics and processor industry, but I am still baffled by the move. Why on earth would AMD want to get mixed up in the cutthroat graphics market? What does ATI bring to the table for AMD? What will the future hold for the newly united companies and their combined technologies?

A: We are sure this is a question that has been flying around in the heads of many PC geeks for the past couple of months. On the surface things might look a bit puzzling, but when we first heard rumors of the deal months before the announcement, it was obvious that the fit between the two was a natural. Here's why:

First, the one area that AMD has struggled with in the desktop and mobile markets is having a "total solution" to complement its processor offering. Especially with large OEMs and ODMs being able to bundle both motherboard chipset and processor features together is obviously a more compelling business model; compared to having to send your customers to third-party manufacturers such as Nvidia or VIA, for example. Also, when AMD acquired ATI, it picked up the third-largest chipset vendor, behind only Intel and VIA. Intel has about 57% of the chipset market while VIA clocks in around 15% and ATI around 12%. Comparatively, Nvidia and SiS have about 9% and 6%, respectively. This information is as of Q1 of 2006, so things may have changed somewhat since then, but you get the gist. ATI brings plenty of chipset horsepower to the table in addition to its obvious strengths in graphics. In the notebook sector, ATI's market share is even greater, and its mobile graphics offering competes head-to-head with Intel's mobile graphics.



From a sheer business strategy perspective, this actually seems like a pretty smooth move on the part of AMD, but what impact will it have on AMD's and ATI's combined technologies moving forward? AMD has been very vocal for a long time now about the significance of the "coprocessor" for future compute architectures. Also, its aggressive licensing of HyperTransport serial interconnect technology is a clear sign of this support. Imagine a tighter coupling of the GPU and CPU where the GPU no longer has to connect to a PCI-E link in the northbridge and then have its data bridge to the HT link in the CPU. Here we see some pretty impressive possibilities, which strike right in Intel's weak spot—for years it has stuck to its QDR shared bus architecture, a topology that is far less scalable. Conversely, AMD's high-speed dedicated serial HyperTransport connections have only become more useful; whether you're considering its 4x4 quad-core approach or the potential direct HT-connected GPU. Possibilities? You betcha.

James T. asked: I'm having a weird problem with my system and hope you can help me figure it out. I have an Athlon 64 3800+ processor, MSI K8T Neo2-F/FIR (MS-6702E) motherboard, 1GB RAM, a GeForce FX 5200, and three hard drives (one Western Digital 80GB drive and two new Seagate 320GB SATA drives). The system has been running fine with my 80GB drive connected to the VIA southbridge; but I wanted more space to back up some videos and photos, so I plugged the new Seagate drives into the board's Promise SATA ports and set them up in a RAID 1 array. When I connect the drives to the Promise controller, the BIOS no longer recognizes my 80GB drive (my OS is installed on the 80GB drive) and the system won't boot. What am I doing wrong? Can I use the Promise RAID controller and VIA southbridge controller at the same time?

A: You're in luck, James. We've had a lot of experience with this MSI motherboard. In fact, the K8T Neo2-F/FIR is actually the board AMD sent to analysts with its first batch of Socket 939 Athlon 64 processors a couple of years ago, so we've spent a lot of quality time tinkering, tweaking, and otherwise getting familiar with it. And, lucky for you, we've experienced an almost identical issue.

The problem has to do with the BIOS installed on your board. If you have BIOS revision 3.2 or older installed right now, the firmware for the board's VIA 8237 controller is outdated. When you're connecting the new drives to the Promise controller, it's not that your existing 80GB drive is no longer recognized, it's that the BIOS won't let you select it as a boot device. The system will still detect the drive, but your OS won't boot because the drives connected to the Promise controller are the only ones that the system BIOS has listed at bootable devices.

> "ATI brings plenty of chipset horsepower to the table in addition to its obvious strengths in graphics."

You can rectify this issue with BIOS revision 3.3 and newer. Go to MSI's technical support page (www.msicomputer.com/support/TechSupport.asp) and click the Latest BIOS Download link under the Online Knowledge Base heading to download the most recent BIOS for your mobo and then flash your motherboard. You'll get a number of new features with this update (v9.2 as of this writing), such as dual-core CPU support and bug fixes.

LilyMeg asked: **I'm considering building a new machine for myself. Although I've never actually put a PC together from scratch before, I'm fairly confident that I know enough about the components to assemble them and which CPU, graphics, motherboard, and memory combination will be right for my needs. At this point I've settled on an Intel Core 2 Duo E6600-based machine along with Intel's D975XBX motherboard and most likely an ATI Radeon X1950 Pro graphics card. I'm not a big-time gamer, but I do like the occasional RPG, such as Oblivion. More importantly, however, is that I want excellent video output and desktop image quality. (I think ATI has a slight edge on these two points.) My main concern with building this PC is power. I'm not into multiple GPUs, but I would like to have sufficient storage and will most likely run a RAID 1 array as a backup point for a single, large 500GB drive I'll put in my system. (I want three drives total.) I also want 2GB of DDR2 RAM in the system. So, although I'm not loading the system down with a lot of graphics power draw (the X1950 Pro is fairly modest I believe), my storage power requirements are probably a bit heavier than most. What would you recommend as a solid power supply for my new system that would also give me a little room to grow?**

A: Well now, that's a mighty fine system you're putting together there, Lily. We think, based upon what you've described as your usage model, that's a well-thought-out component selection. The Intel motherboard you've picked will be rock-solid stable and give you the ability to upgrade to a Core 2 quad-core chip (Kentsfield) down the road if you want. The ATI Radeon X1950 Pro card will also work well for you with its excellent 2D desktop IQ, great video processing, and HDR with AA available in Oblivion. But we digress; on to your power supply question.

Your concern regarding your storage array power demands is sound. The CPU and GPU selections you've made aren't over the top in terms of power consumption, so it's a good idea to focus on the three-hard drive setup you mentioned. Hard drives draw from 5V and 12V power sources; the 5V rail actually requires the most current. The average 250GB drive draws about 10 to 12W of power under load, so for a three-drive setup (for a pair of 250GB drives in RAID 1 and a single 500GB drive), figure on about 36 to 40W just for your hard drives. This might not sound like a lot, but it is significant. We'd suggest going with a quality PSU that has a beefy 5V rail and multiple independent 12V rails and has at least a 600W capacity or more.

We like Enermax's Liberty line of PSUs, which have a solid 620W offering that ought to do the trick. In addition, Corsair's recently announced CMPSU-620HX is another excellent option with three 12V rails at 18A each and 30A across the 5V rail. Either one of these PSUs should handle your setup easily and give you the ability to scale up your CPU or GPU capabilities down the road. ▲

by Dave Altavilla and Marco Chiappetta,
the experts over at HotHardware.com

Corsair's new 620W PSU has three 12V rails with 18A each and a 5V rail with 30A of capacity—easily enough juice for a new Core 2 Duo and single-GPU or midrange multi-GPU system configuration.

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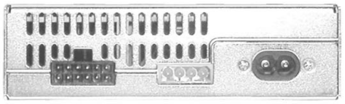
REAR VIEW



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Laser Nanoantenna

Bringing Terabytes To Optical Discs

When changes come to optical disc storage technologies, they're typically big-time changes. The 650MB of storage on a burnable CD seemed great—at least until burnable DVDs provided 4.7GB and more of storage. And next-generation optical disc technologies (HD DVD with at least 15GB and Blu-ray with at least 25GB) could make DVDs obsolete. But now Harvard University researchers (led by Professor Federico Capasso and Assistant Professor Ken Crozier) are developing a laser nanoantenna that could blow those storage technologies away with the strength of a Category 5 hurricane. The laser nanoantenna, also called a plasmonic laser antenna, could eventually lead to a storage capacity of 5TB on an optical disc the size of a DVD or CD.

Laser Microscopes Now; Optical Storage Later

The laser nanoantenna focuses a laser beam to create an extremely small spot of light, which would allow extremely small storage bits on an optical disc. The laser nanoantenna also could work with several applications, including near-field laser microscopes and spectroscopy. Harvard researchers say those other applications are more likely uses for the laser nanoantenna than optical storage—at least at first.

Still, researchers are keeping a close eye on the optical storage segment of the market. "Obviously, there's a demand for optical discs with greater storage capabilities," Capasso says. "Between where we are now and doing this, there is a whole lot of work: We need to design a [read/write] head. But I think the path is clear."

Capasso says the research group is getting attention from several companies interested in developing the technology. Crozier says they'll need the research, development, and marketing that a large company could provide before they commercialized the technology. "Top universities like Harvard have the time, resources, and brain power to do the long-term research needed for these products. The industry cannot always do this with the short product turnarounds," says Capasso

Furthermore, Capasso says, "The cycle from invention to commercial product, the average time is now on the order of 10 years. This is very hardware-intensive. The potential is a lot, but it's not going to happen overnight." ▲

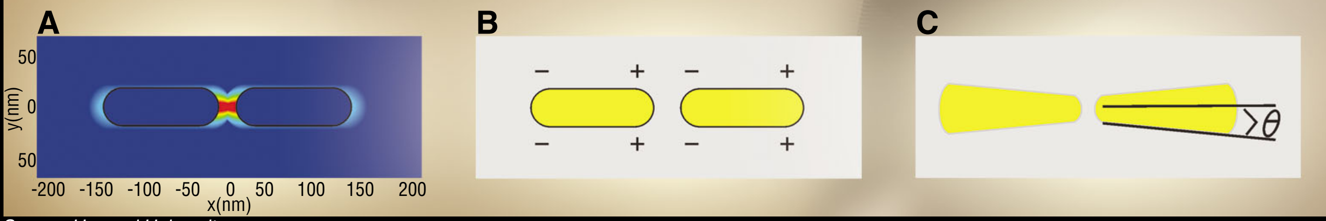
by Kyle Schurman

Creation Of The Laser Nanoantenna

The laser nanoantenna consists of an optical antenna fabricated on the laser's facet (which is the area where the light output occurs). The optical antenna consists of two gold rectangles with rounded edges, each about 130nm long and separated by a gap of about 30nm (graphic A). The researchers evaporated a gold layer directly onto the laser to create the laser nanoantenna. They then used a focused ion beam to remove the gold from unwanted areas to form the antenna. (The researchers used gold for the antenna because of the metal's high conductivity at optical frequencies. Also, gold suffers only minimally from problems such as degrading or tarnishing that commonly affect other metals.) "The design of the antenna, in particular its length, would need to be suitably modified, depending on the wavelength of the laser," Crozier says.

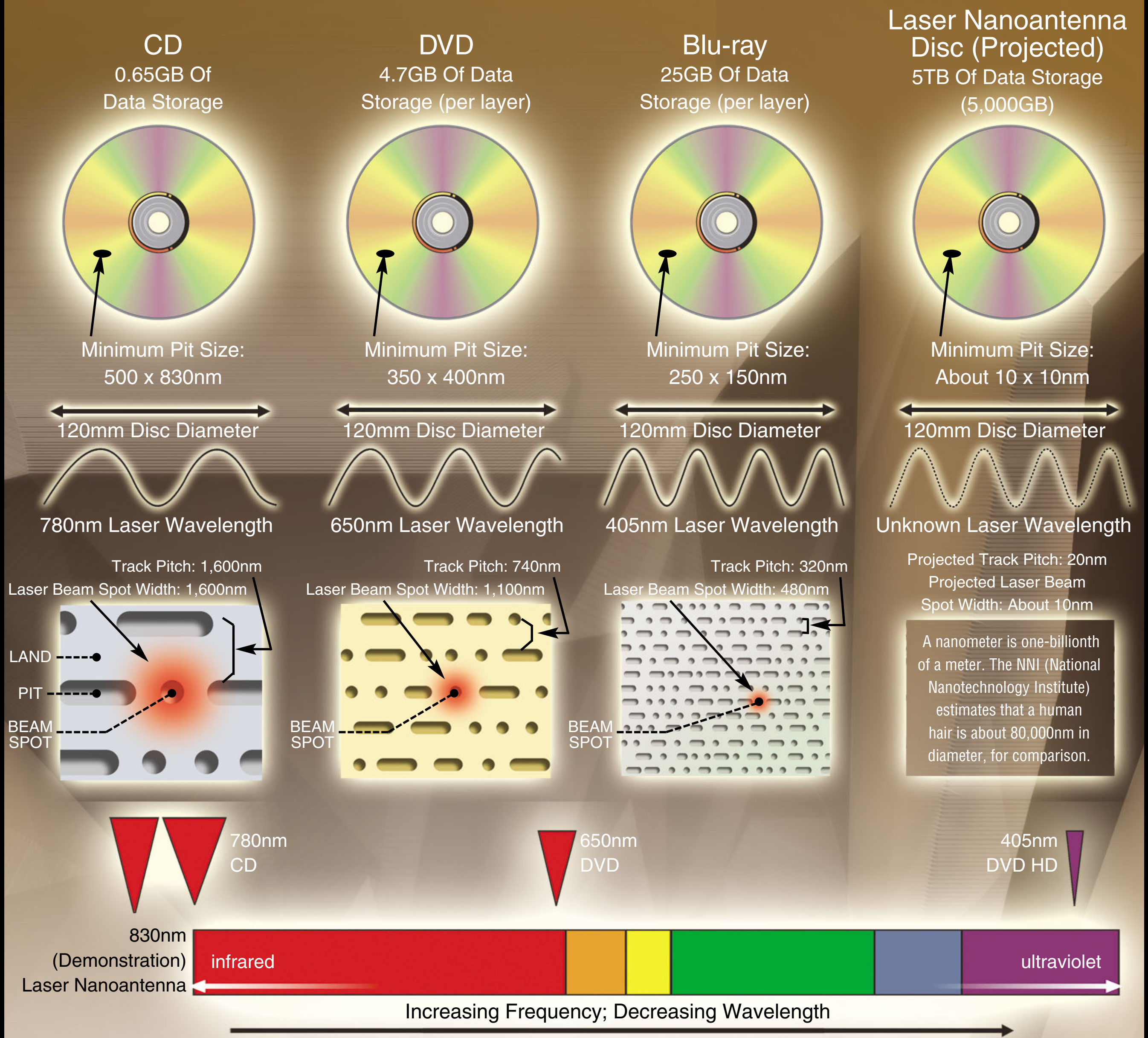
As light from the laser illuminates the optical antenna, the electrical charges in the two segments of the antenna move to opposite ends, leaving opposite charges on each side of the gap (graphic B). The opposite charges let the antenna intensely focus the laser light to a small spot (graphic A). The Harvard researchers measured the light from the focused laser to a spot of about 40 x 100nm. Without the use of the optical antenna, the laser spot would've measured about 400nm in diameter.

Finally, the researchers may reform the antenna, making it into more of a bowtie shape (graphic C). "We expect a bowtie design would give a more intense spot of light," Crozier says. "In addition, we observed bright spots at the far edges of our antenna, though they were not as bright as in the antenna gap. We expect that this effect of having bright regions on the antenna in locations other than the gap would not be as prevalent with a bowtie design." ▲



Source: Harvard University

Terabytes Of Storage


CD
0.65GB Of Data Storage
DVD
4.7GB Of Data Storage (per layer)
Blu-ray
25GB Of Data Storage (per layer)
Laser Nanoantenna Disc (Projected)
5TB Of Data Storage (5,000GB)
Minimum Pit Size: 500 x 830nm
Minimum Pit Size: 350 x 400nm
Minimum Pit Size: 250 x 150nm
Minimum Pit Size: About 10 x 10nm
120mm Disc Diameter
120mm Disc Diameter
120mm Disc Diameter
120mm Disc Diameter
780nm Laser Wavelength
650nm Laser Wavelength
405nm Laser Wavelength
Unknown Laser Wavelength
Track Pitch: 1,600nm
Laser Beam Spot Width: 1,600nm
LAND
PIT
BEAM SPOT
Track Pitch: 740nm
Laser Beam Spot Width: 1,100nm
BEAM SPOT
Track Pitch: 320nm
Laser Beam Spot Width: 480nm
BEAM SPOT
Projected Track Pitch: 20nm
Projected Laser Beam Spot Width: About 10nm
780nm CD
650nm DVD
405nm DVD HD
830nm (Demonstration) Laser Nanoantenna
infrared
ultraviolet
Increasing Frequency; Decreasing Wavelength

A nanometer is one-billionth of a meter. The NNI (National Nanotechnology Institute) estimates that a human hair is about 80,000nm in diameter, for comparison.

Harvard University researchers haven't yet demonstrated the laser nanoantenna's ability to store data on an optical disc. However, their research indicates that it should work with the proper modifications.

During demonstrations of the laser nanoantenna in late 2006, Harvard Assistant Professor Ken Crozier said the researchers used an infrared laser with a wavelength of 830nm. "In principle, the antenna would work with any laser," he says. But to make the laser nanoantenna work for optical disc storage, Crozier and fellow professor Federico Capasso say they need to develop a writing medium for the laser that could hover 10 to 20nm above the surface of the optical disc. (Because of the proximity of the laser to the storage medium, researchers sometimes call this "near-field" optical storage technology.) "I would expect that if it were possible to use the laser nanoantenna for optical disc storage, one could use discs made of similar materials to CDs and DVDs, but the design of the discs would need to be changed," Crozier says, "[because] the writing medium would need to be in very close proximity to the laser nanoantenna. The laser nanoantenna concentrates light to a tiny spot—we've measured 40 x 100nm—but the light spreads out as you move away from the nanoantenna. Therefore, the nanoantenna needs to be very close to the medium."

Placing the writing medium so close to the optical disc will take some additional research, but Capasso is confident the researchers will be successful. "We have to put the laser at a distance of tens of nanometers, using the near-field principle," Capasso says. "We know how to do this from hard drive technology [where the read/write head hovers just above the platter]. The head's movement is like flying a 747 a few inches from the ground." ▲

Sources: Harvard University, Wikipedia, Memorex

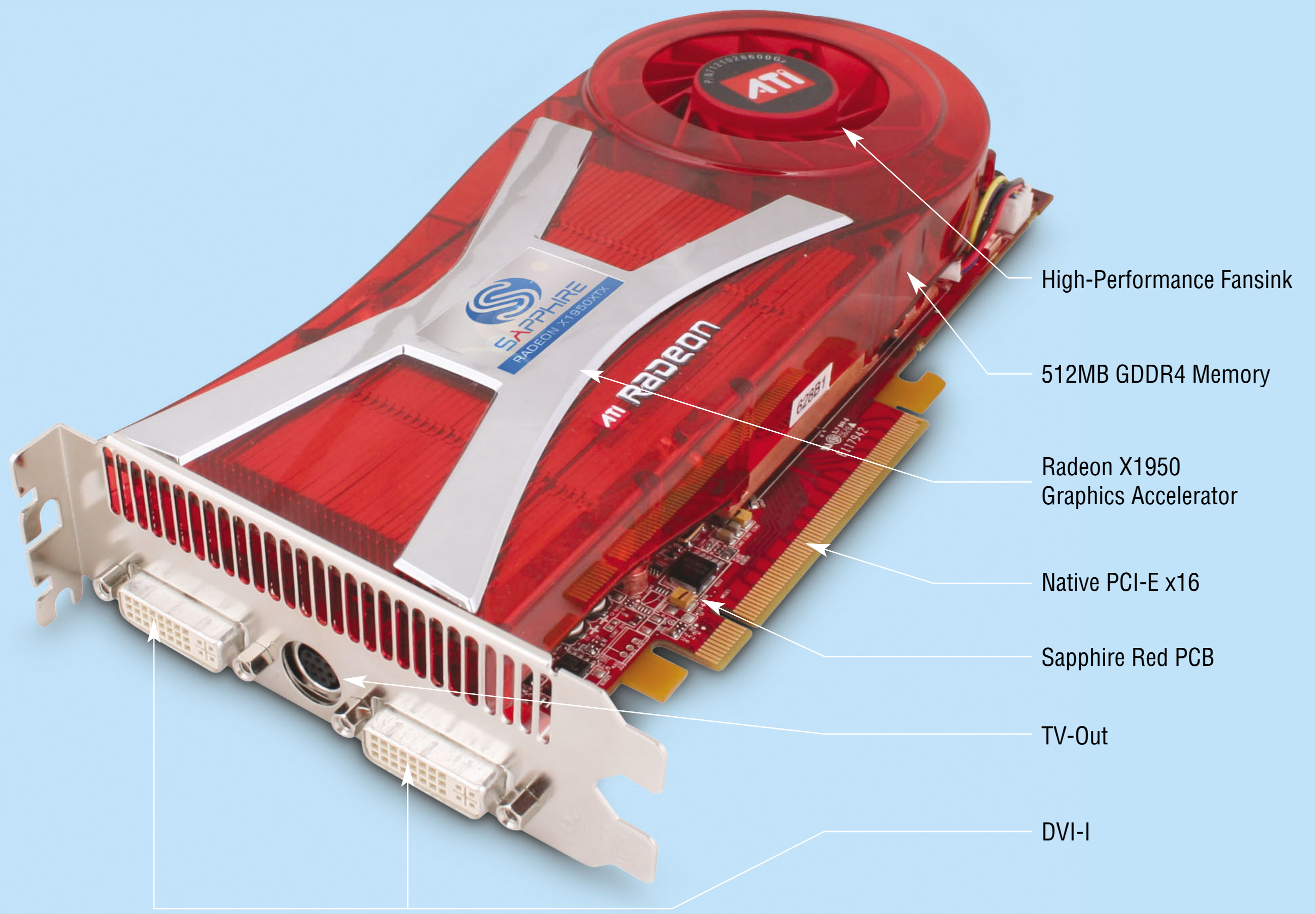
GDDR4

Graphics Memory That Delivers Processing Punch Without Sucking Power

It's something many of us have known all along. Still, it is nice to hear it occasionally as a reminder: Overclockers and fanatic gamers make the world go around—the world of graphics processing and memory, that is. "Die-hard gaming enthusiasts are on the bleeding edge, and we're listening to what they have to say," says Joe Macri, ATI's director of technology. "They're the ones who use our latest products. And if no one buys the newest stuff, at some point, we're going to have to stop building it," Macri says with a laugh.

It doesn't appear ATI has to worry about users buying its newest graphics products, especially when it comes to its Radeon X1950 graphics card family, which became the first family of cards featuring GDDR4 memory modules in August 2006. The GDDR4 specification yields memory modules that improve power management while delivering more processing capabilities.

ATI X1950 Layout



As you can see from this Sapphire Technology X1950 XTX card, the GDDR4 memory module is seated near the fan, allowing for additional cooling for the memory chips.

Joe Macri, ATI's director of technology, says the company designed the X1950 to be quieter after hearing from analysts and users that the company's recent graphics cards were too noisy. By reducing the heat the memory generates, slowing the fan down, and placing the fan farther from the exhaust grille, ATI reduced the card's overall noise level. ▲

Sources: ATI, SapphireTech.com

And most reviews and benchmarks of ATI's X1950 (including *CPU*'s review of the XTX and CrossFire Edition cards on page 22 in the Nov. 2006 issue) have indicated that GDDR4 is delivering on its promises.

The Development Of DDR4

The JEDEC Solid State Technology Association is an organization of approximately 300 companies that oversees the standardization of semiconductor devices and integrated circuits. Various committees make up the JEDEC, and each committee is in charge of a particular technology. ATI's Macri serves as president of the JEDEC committee that initially published the GDDR4 standard late in 2005. The GDDR4 specification includes several new features, but it also borrows from GDDR3 and DDR specifications.

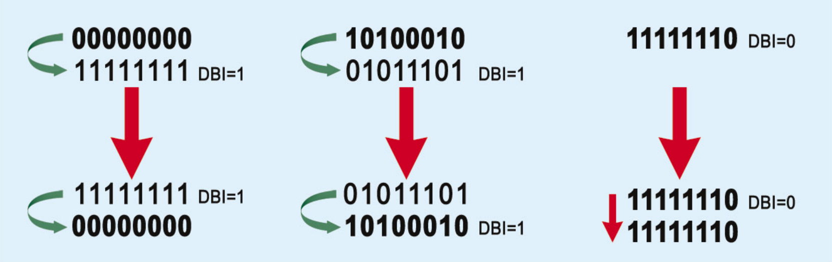
Macri says the GDDR4 committee entered the process of developing the specification with two goals: Providing speed for high-end gamers and conserving the memory's power consumption (which gives the GPU more power options). "Power was a big focus of GDDR4," Macri says. "We have to control the power elements on the card; you can only have so much heat on the card.

Data Bus Inversion

An important technology that provides the power savings users can find in GDDR4 is DBI (Data Bus Inversion). Essentially, DBI inverts the data stream of 0s and 1s when users need to save power. ▲

Example A	Example B	Example C
00000000	**10100010**	**11111110**

1. Moving 0s that travel at high power states along the data bus requires more power than moving 1s because they travel on the bus as a low power state. When an 8-bit data string contains more than four 0s, the GDDR4's DBI technology starts working. DBI inverts the data string and sets the DBI flag to 1, as shown in Examples A and B. In Example C, DBI doesn't invert the data string (which contains only one 0) and sets the DBI flag at 0.

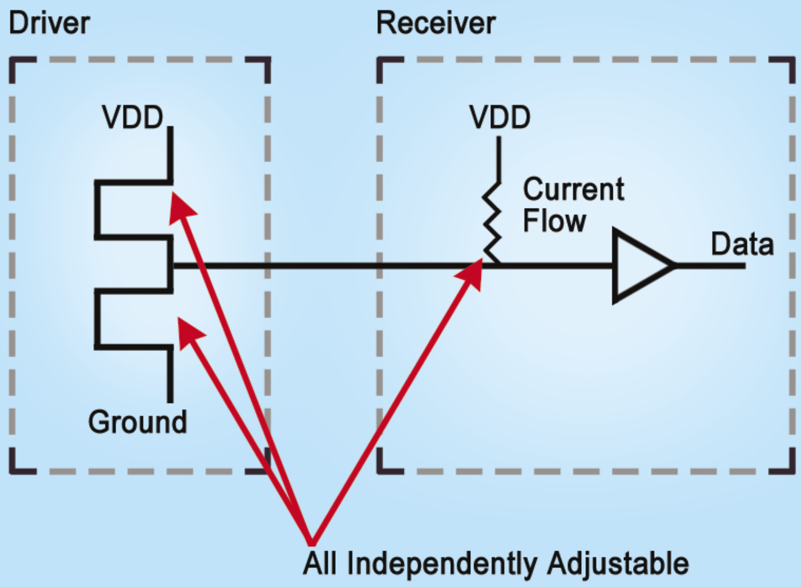


2. When the sender passes the data to the receiver, it saves power by inverting the data string when needed and sending more 1s than 0s in the data string. The receiver then reads the DBI flag in the data string. If the DBI flag is a 1 (as in Examples A and B), the receiver inverts the string, returning it to its original value. When the DBI flag is a 0 (as in Example C), the receiver accepts the string as is.

Source: ATI

The Driver Makes Adjustments

As part of the GDDR4 specification, the graphics card driver can tweak a few aspects of the memory module, including the driver and the terminator. By fine-tuning various aspects of the memory, the module can work faster and more efficiently. "We use the tweaks to try to get every DRAM in the world to look the same," Macri says. "When they look the same, we can make them go faster."



Source: ATI

The memory is more efficient, and the GPU can consume more power."

GDDR4's improved speed is pretty obvious after a quick glance at the specifications for the X1950 XTX card. These specs include a memory bandwidth of 64GBps and an effective memory speed of 2GHz. "The biggest merit of GDDR4 is its high-level speed," says Kim Ah-Young, a spokesperson for Hynix Semiconductor (www.hynix.com), one of the world's leading graphics memory manufacturers.

End Of DX9

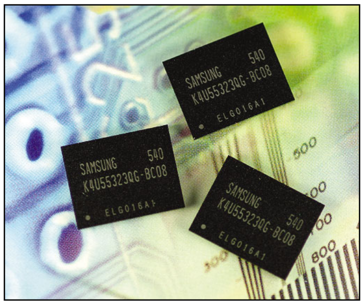
Although the X1950 family marks the beginning of a technology—by introducing GDDR4 to the graphics memory market—it also likely will mark the end of a technology by possibly being ATI's last GPU family made for DirectX 9. The next family of ATI GPUs most likely won't appear until after the launch of Windows Vista and DirectX 10 (sometime in early 2007).

With some of the overclocking potential that the X1950 shows with GDDR4, though, waiting for DX10 will not be too painful for high-end gamers. "With lower-power memory systems, there's more and more natural headroom," Macri says. "The X1950 has the world's fastest memory interface on it. It just blew us out of the water." ▲

by Kyle Schurman

GDDR3 vs. GDDR4 Memory Module

The differences between GDDR3 and GDDR4 memory modules aren't going to jump out from a general inspection of the chips themselves, but, once you begin studying the specifications and features, the differences are impossible to ignore, as you can see from these two Samsung memory modules. (Differences between the two modules are indicated in red.) ▲

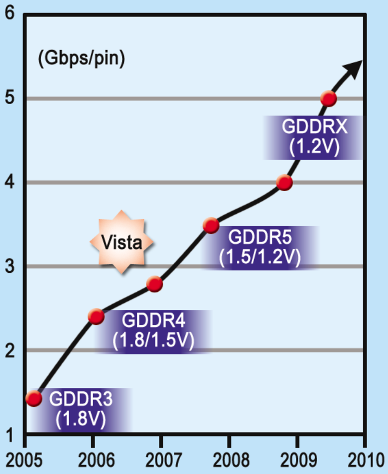
Samsung's GDDR3 module	**Samsung's GDDR4 module**
Model: K4J52324QC	**Model: K4U52324QE**
	
512Mb (2M x 32-bit x eight banks)	512Mb (2M x 32-bit x eight banks)
7.2GBps per chip max data speed	11.2GBps per chip max data speed
1.8Gbps per pin max data rate	2.8Gbps per pin max data rate
2V power supply for device operation	1.8V power supply for device operation
2V power supply for I/O interface	1.8V power supply for I/O interface
Eight internal banks for concurrent operation	Eight internal banks of concurrent operation
Burst length: 4 bits	Burst length: 8 bits
Single-ended RDQS (read strobe) per byte	Single-ended RDQS (read strobe) per byte
Single-ended WDQS (write strobe) per byte	Single-ended WDQS (write strobe) per byte
No DBI technology	Includes DBI technology
32ms auto refresh (8K cycle)	32ms auto refresh (8K cycle)
136-ball FBGA package	136-ball FBGA package

Sources: Samsung

Graphics Memory Projection

As products featuring GDDR4 memory modules begin appearing with regularity early this year, some industry analysts already are turning their attention to the next graphics memory specification, GDDR5. For instance, DRAMeXchange, a memory market research company, says manufacturers will begin offering GDDR5 memory modules by the end of 2007. This could give some consumers a reason to consider waiting for the new specification before buying new graphics cards.

But ATI's Macri, who is president of the JEDEC committee that develops and oversees the GDDR specifications—including GDDR5—says those projections probably aren't realistic. His early guess for when GDDR5 products will appear in stores: the 2008 holiday season. "It's not 12 months away," Macri says. "We're still working on it. We have about 70% of the concepts nailed down, but in engineering, that last 30% is like climbing Mount Everest with no oxygen." ▲



Samsung's projection for the future of graphics memory and the GDDR specification shows continued improvements in voltage and power consumption. This graph measures the bandwidth of each pin in gigabits per second per pin.

Sources: Samsung, ATI

GDDR4 & GDDR3 Card Matchup

Putting GDDR4 memory modules in ATI graphics cards greatly increases memory speed and bandwidth compared to what's available with GDDR3—even though the memory interface doesn't increase. ▲

Product Name	X1950 Crossfire	X1950 XTX	X1900XT 512MB/256MB	X1900GT
Core Speed	650MHz	650MHz	625MHz	575MHz
Memory Speed	2GHz	2GHz	1.45GHz	1.2GHz
Memory Size	512MB DDR4	512MB DDR4	512MB/256MB DDR3	256MB DDR3
Memory Interface	256-bit	256-bit	256-bit	256-bit
Pixel Shader Processor	48	48	48	36
Vertex Shader	8	8	8	8
HDCP Support	Yes	Yes	Optional	Optional
Geometry Transform Rate (vertices/second)	1.3 Billion	1.3 Billion	1.25 Billion	1.15 Billion
Memory Bandwidth	64GBps	64GBps	46.4GBps	38.4GBps
Pixel Fill Rate	10.4 Billion/sec	10.4 Billion/sec	10 Billion/sec	6.9 Billion/sec

Memory speed. With the X1950 cards that use GDDR4, the memory speed increases by 38% to 2GHz compared to a maximum memory speed of 1.45GHz in cards using GDDR3. (The memory speed listed here is the "effective" speed, which is twice as fast as the standard speed.)

Memory bandwidth. The memory bandwidth climbs to 64GBps with the X1950 cards. This is a 38% increase over the maximum bandwidth of 46.4GBps in a card with GDDR3.

Sources: ATI, TUL

Key Features Of The GDDR4 Specification

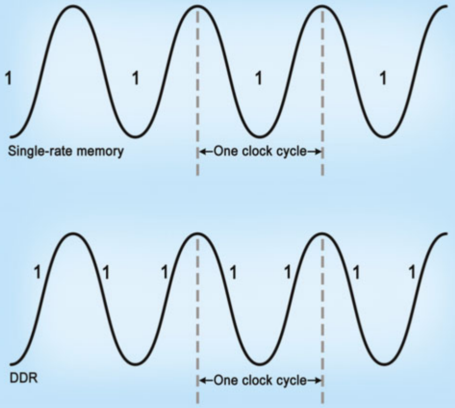
With its GDDR4 specification, the JEDEC Solid State Technology Association outlined several features that give GDDR4 memory modules increased performance while using less power.

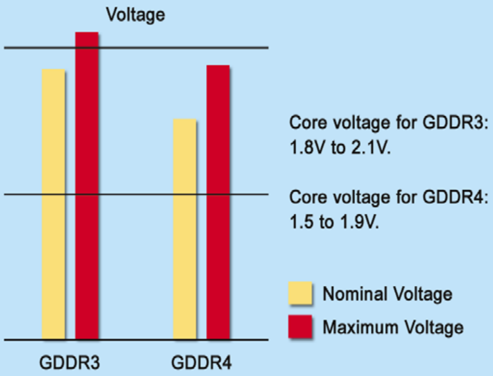
The GDDR4 standard initially works with the following memory configurations, using either four or eight internal memory banks (although the future of GDDR4 is with eight banks):

- 256Mb (2 million addresses x 32 bits x four banks)
- 512Mb (2 million addresses x 32 bits x eight banks)
- 1Gb (4 million addresses x 32 bits x eight banks)

Some of the other features include:

- DDR architecture, meaning two data transfers per clock cycle (upper-right diagram). Using DDR allows for high-speed operation.
- GDDR4 can use a lower voltage than GDDR3 (lower-right diagram), which results in a power consumption savings of 20 to 25%, according to Macri. Running at a lower voltage doesn't affect the memory module's performance, though. GDDR4's nominal core voltage can be as low as 1.5V (with the ability to boost to 1.9V for overclocking).
- The fixed burst length of GDDR4 now is 8 bits vs. the 4 bits for GDDR3. That feature lets the GDDR4 memory potentially run at half the core clock frequency of a GDDR3 chip, while yielding the same memory bandwidth. Lower core clock frequencies yield lower latency and, when needed, provide additional overhead for overclocking. ▲





Sources: ATI, BeHardware.com, AnandTech

time for review

The Best Of Power User Technology In 2006 (& Beyond)

52 **components we crave**
Prime Parts For Your PC's Fix

58 **cool inputs & outputs**
Peripherals That Shined In 2006

62 **exceptional executables**
Applications That Sang

66 **who's got next?**
PC Parts To Look Forward To

Sometimes you have to take a good look back to know where it is you're headed. In the past 12 months, we've seen a lot of hardware and software pass through our doors. Some of us have ventured around the country and overseas to get an even better look. Some of what we saw in 2006 helped the industry as a whole take some significant strides forward, and in the process, gave us a better idea of what life may resemble in five or 10 years. Some of the things we set our eyes on weren't so hot and gave us a better idea of what we can leave behind.

In the past year, we also picked the brains of dozens of analysts, experts, engineers, developers, promoters, inventors, innovators, and originators. From these conversations we've gleaned much about many of the major technological categories, subcategories, and still-developing threads that help drive the industry. For example, we learned far more about Vista this year, and not just the fact that projected launch dates mean little, that is. We've welcomed in Conroe and the dawning age of prevalent multicore processing. We've seen, read, and heard more about viral videos, social networking, and MySpace than we probably ever wanted, but our mouths also watered more and more as we watched HDTV filter into more areas.

We witnessed a union between Intel and Apple. We saw AMD gobble up ATI, Dell zap Alienware, Google swallow YouTube's bait, and Voodoo join forces with HP. We got ever more familiar with CrossFire, Quad SLI, rootkits, Socket AM2, the evolution of Firefox, IE7, the GeForce 8 series, and the stellar X1950 XTX. We even got our first glimpse of the "mighty iPod slayer," Zune. Last year at this time, we were glossy-eyed in anticipation of the Xbox 360. And now the hot products we're craving are Sony's PlayStation 3, and yeah, even Nintendo's Wii, too (for our kids, of course).

We learned long ago that staying current on even the biggest industry developments and breakthroughs is difficult, let alone keeping tabs on every utility, converter, adapter, cable, port, software upgrade, plug-in, or RAID development. Such was the case in 2006. Technology just doesn't wait around because we have to sleep, even for power users. That doesn't mean we can't try, though.

For the following articles, we took a deliberate, focused walk back through the months that were 2006. We looked hard and long and did some serious reflecting on the hardware, software, trends, fads, shifts, changes, and all else we crossed paths with. From our observations we selected the best components, peripherals, and software we felt surfaced last year, basing our conclusions not only on performance but also on how each selection fits into the bigger, long-term computing picture.

Ultimately, we settled on a top pick and two runners-up in each category, detailing why each made our list. In making our selections, we've tried to remain as true as possible to the power user's code, meaning there's a reason why developments in Ageia's very real PhysX rank higher with us than developments in the still-unseen iPhone, no matter what Google says (1.93 million pages vs. 5.32 million pages, respectively, at last check).

Additionally, because we can learn from mistakes and misfortune, we forced ourselves to review some the biggest disappointments from last year, and not necessarily from a benchmark or fps perspective. Sometimes, disappointing means something we eagerly awaited instead merely burst our hype-filled balloon (think Blu-ray and HD DVD). Not ones to live in the past, though, we've also used what we saw in 2006 to make some projections about 2007. When applicable, you'll find details, launch/shipping dates, and visuals for potential hardware, software, trends, and developments to look forward to.

So, look our picks over and let us know where you agree and disagree, as well as where you feel technology is leading us. Chances are we'll meet again next year to compare notes and do it all over.

by Blaine A. Flamig

components we crave

Prime Parts For Your PC's Fix

2006 was an exciting year to be a PC enthusiast. In the past 12 months, dual-core processors went mainstream; Intel unveiled a new microarchitecture that propelled its mobile, desktop, and server processor families to the top of the benchmark charts; and AMD moved to a new socket and updated its Athlon 64 X2 processors with support for faster DDR2 memory. Both Nvidia and ATI also released a plethora of new graphics cards targeted at virtually every segment of the market.

We witnessed the introduction of next-gen optical and hard drive storage technologies, such as Blu-ray, HD DVD, and perpendicular recording, and a multitude of highly integrated, enthusiast-class motherboards arrived based on new chipsets from all of the major players in core logic. Even system memory, which historically hasn't changed much in the past decade or so, was rife with its share of new innovations.

Without a doubt, 2006 will be remembered as a banner year in terms of new technologies for the PC. And to commemorate all of the great products and innovation of the last 12 months, we've put together a list of some of our favorites in a handful of major categories. To offer a bit of contrast, we've also selected a few products that didn't quite live up to all the hype and left us feeling a bit flat. Saddle up and strap in; this is going to be a bumpy ride.

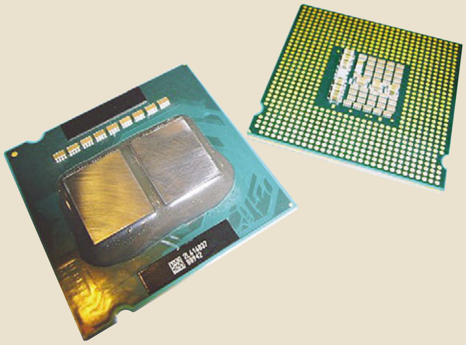
Processors

Both Intel and AMD completely revamped their respective processor product lines in 2006. Intel put the NetBurst microarchitecture and Pentium name to rest and unleashed the Core 2 Duo. With it, the chipmaker no longer played second fiddle to AMD's successful Athlon 64 in terms of features and performance. AMD moved to its Socket AM2 platform and surgically replaced the K8's DDR memory controller with one that supported faster DDR2 RAM, but the switch to a different memory type wasn't enough to keep pace with Intel's new baby. With that, we declare Intel's Core 2 Extreme X6800 and QX6700 processors the best of '06.

Winner: Tie, Intel Core 2 Extreme X6800 & Core 2 Extreme QX6700

We know it's a bit capricious to select two processors as the best of '06, but picking either one of these excellent CPUs over the other just wouldn't be right. Thanks to its higher clock speed, the dual-core 2.93GHz Core 2 Extreme X6800 is hands down the fastest CPU for gaming and running single-threaded applications, but the 2.66GHz, quad-core Core 2 Extreme QX6700 is the cream of the proverbial crop for running multithreaded applications or extensive multitasking.

Both processors are based on Intel's Core microarchitecture and share essentially the same feature set, which includes Wide Dynamic Execution, Smart Memory Access, Advanced Smart Cache, and Advanced Digital Media Boost technologies, but the QX6700 has two dual-core dies linked together via the processor's packaging for a total of four execution cores. The X6800, on the other hand, has a single, monolithic dual-core die. The sum of the new microarchitecture and technologies employed in the Core 2 Extreme X6800 and QX6700 processors makes these desktop processors the fastest we've experienced to date.



Intel's quad-core Core 2 Extreme QX6700 processor sports a pair of 4MB Conroe cores linked together via the chip's packaging.

First Runner-Up: Intel Core 2 Duo E6400

Our second favorite processor of 2006 was also part of Intel's Core microarchitecture-based products. The 2.13GHz Core 2 Duo E6400 shares the same base feature set as its more powerful cousin, the Core 2 Extreme X6800, but the E6400 is clocked lower and only has 2MB L2 cache. Of course, at about $220, the Core 2 E6400 also happens to be significantly more affordable than its higher-clocked counterparts. With a little overclocking, the E6400 has been known to hit clock frequencies in excess of 3GHz, which makes this processor the perfect choice for high-performance PC enthusiasts on a tight budget who don't mind running a few components out of spec.

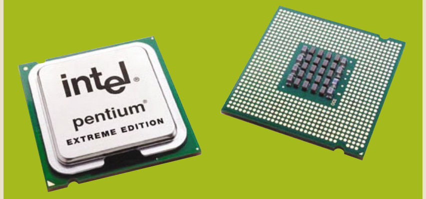
The release of the Core 2 Duo in 2006 marked the end of AMD's performance dominance on the desktop.

Second Runner-Up: AMD Athlon 64 X2 4600+ EE (Energy Efficient)

With Intel's Core 2 Duo processors on the scene, it's exceedingly difficult to recommend a high-end AMD Athlon 64 X2 or FX processor at the moment, but thanks to some price cuts and advances in manufacturing, the higher-volume, mid- and low-end CPUs still remain relatively competitive. And at about $250, AMD's Athlon 64 X2 4600+ EE, is a fine processor for myriad build types. In its default configuration (1.2V at 2.4GHz), the chip has a maximum power rating of only 65W, which makes it a good choice for low-power and quiet computing scenarios. Bump up the voltage a bit, though, and the X2 4600+ EE becomes one heck of an overclocker. We've ramped some of these chips over 2.8GHz, the same clock speed as the more expensive FX-62.

Biggest Disappointment: Intel Pentium Extreme Edition 965

Despite being one of the highest clocked processors to come out of Intel, the 3.73GHz Presler-based Pentium Extreme Edition 965 couldn't compete with AMD's higher-end Athlon 64 X2 and FX processors when Intel released it in'06. The addition of the C1E halt state and a new stepping to drastically lower power consumption didn't even the score, either. Add to these the fact that Intel had already released the still impressive Core 2 Duo performance data, and the Pentium Extreme Edition 965 had very little redeeming value. ▲



Although the Pentium Extreme Edition 965 was Intel's most powerful dual-core processor prior to the Core 2's release, it wasn't able to match the best AMD had to offer.

Motherboards & Chipsets

Along with the smorgasbord of processors that came out of Intel and AMD in 2006, an equally long list of core logic chipsets and motherboards arrived to support them. Every major player in core logic introduced something new this past year, and motherboard manufacturers were quick to capitalize. We've broken down our motherboard and chipset category into two groups—one for the Intel platform, the other for AMD.

Intel Motherboards

Winner: Asus P5W DH Deluxe

When we first reviewed the Intel 975X Express-based Asus P5W DH

Deluxe in our Core 2-compatible motherboard roundup (see page 59 in the Sept. 2006 issue of *CPU*), we praised it as one of the most impressive motherboards we'd ever come across. The P5W DH Deluxe has an extensive feature set that includes RAID, HD Audio, dual-Gigabit Ethernet, built-in Wi-Fi, and CrossFire support. And since our review, street prices have dropped considerably, and BIOS updates have unlocked hidden features and functionality. Now, the P5W DH Deluxe costs about $215. With the board's current BIOS multiplier adjustments letting you set lower multipliers for any Core 2 Duo processor (not just the unlocked Core 2 Extreme X6800), the P5W DH Deluxe provides its share of fun overclocking experiments.

In terms of features and overclockability, the Asus P5W DH Deluxe is everything an Intel 975X Express-based motherboard should be.

First Runner-Up: Asus P5N32-SLI SE Deluxe

For the better part of the second half of '06, if you wanted a Core 2 Duo processor and SLI support, a motherboard based on Nvidia's nForce 4 SLI X16 Intel Edition chipset was your best option. And our choice for the best nForce 4 SLI X16 IE mobo is another Asus product, the P5N32-SLI SE. In our testing, we found the P5N32-SLI SE was every bit as fast as motherboards based on Intel's flagship 975X Express chipset, with the added bonus of being compatible with SLI. The board is also a decent overclocker, and at about $200 it's not quite as expensive as other high-end Core 2-compatible offerings.

Second Runner-Up: Abit AB9 Pro

The second runner-up in our group of Intel-compatible motherboards is Abit's P965-based AB9 Pro. The $145 AB9 Pro sports a single PEG slot, so multi-GPU rendering is out of the question, and it's almost completely legacy-free. Still, it does have most of the features enthusiasts crave, such as RAID, HD Audio, and an overclocker-friendly BIOS. Its respectable features, low price, and competitive performance make the Abit AB9 Pro a great choice for Core 2 consumers on a limited budget.

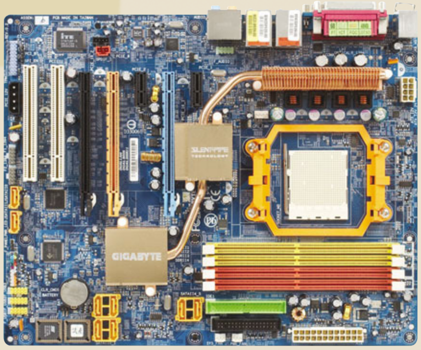
AMD Motherboards

Winner: Gigabyte GA-M59SLI-S5

Fans of AMD's processors have long enjoyed a veritable cornucopia of high-quality, enthusiast motherboards. And the transition to a new socket in '06 did little to slow down the progression. Late in the year, Gigabyte released an nForce 590 SLI-based board that did so many things well it had to be our choice for the best AMD motherboard of the year.

The GA-M59SLI-S5 fully exploits all of the features inherent to the nForce 590 SLI chipset, such as RAID, a full-bandwidth, 16-lane link to each PEG slot for SLI, and dual-Gigabit Ethernet. Its performance is in line with competitive offerings, which is typically the case with Socket AM2 motherboards. But the board stands out from the rest in a couple of interesting ways. For one, the GA-M59SLI-S5 is outfitted with an impressive seven expansion slots, three of which are full-length PCI Express x16 slots. The third PEG slot should come in handy in the future when GPU physics becomes more prevalent.

An impressive overclocker, the GA-M59SLI-S5 also includes an extensive bundle of accessories and has a competitive price tag of about $190. Except for a couple of minor layout and BIOS interface issues, there's nothing to dislike about the GA-M59SLI-S5.



Gigabyte outfitted the excellent GA-M59SLI-S5 with three PCI Express x16 slots, a half-dozen internal SATA ports, and a silent, all-copper, heatpipe to cool the chipset and VRM.

First Runner-Up: Asus CrossHair

Like the Gigabyte GA-M590SLI-S5, the Asus CrossHair is an nForce 590 SLI-based mobo. The CrossHair has all of the same bells and whistles that enthusiasts crave and an overclocker-friendly BIOS to boot. But the board also sports an 8-phase EL-Capless power design, silent heatpipe cooling, and handy onboard power, reset, and clear CMOS switches. In addition to these goodies, the CrossHair is equipped with an electroluminescent I/O cluster, about a dozen LEDs to light a system's internals, and a helpful backlit LCD POST code error reporter.

Second Runner-Up: ECS KA3 MVP

ECS' KA3 MVP was the first widely available Socket AM2 motherboard to utilize ATI's CrossFire Xpress 3200/SB600 southbridge chipset combo. Naturally,

ECS' affordable KA3 MVP was the first Socket AM2 motherboard to ship with ATI's CrossFire-enabled RD580 northbridge and SB600 southbridge.

the KA3 MVP fully supports CrossFire with true dual-PCI-E x16 graphics slots, along with HD audio and support for 3Gbps SATA with RAID. The KA3 MVP also has a good layout, an actively cooled VRM, and a well-appointed BIOS with a somewhat limited but decent assortment of overclocking options.

But the KA3 MVP shined in terms of value. You can find this board for under $125. That's a steal considering the performance and features the KA3 MVP offers.

Biggest Disappointment: Nvidia nForce 590 SLI Intel Edition

From a technology standpoint, there's a lot to like about Nvidia's nForce 590 SLI Intel Edition chipset. It's fast and loaded with features. But motherboards based on the chipset never hit the streets in any real quantity until late October/early November, many months after its initial introduction. By that time, news of its replacement, the nForce 680i SLI chipset, had already broken, and the nForce 590 SLI Intel Edition lost much of its luster. ▲

Graphics Cards

Since the first true 3D accelerators arrived in the early '90s, PC graphics cards have advanced at a fervent pace. 2006 proved to be one of the most exciting years in recent memory with regard to graphics: Both ATI and Nvidia introduced new architectures and graphics cards that offered performance worlds ahead of respective predecessors.

Winner: Nvidia GeForce 8800 GTX

It arrived late in the year, but Nvidia's GeForce 8800 GTX was, without a doubt, the most impressive graphics card released in 2006. Before its official introduction, rumors circulated that the G80 GPU used on the 8800 GTX would support DirectX 10, but that it wouldn't be a fully unified architecture. Some also claimed that cards would need watercooling because the GPU ran so hot. Neither of these rumors turned out to be true, and when the GeForce 8800 GTX hit, it smoked everything else available at the time.

The GeForce 8800 GTX not only arrived with a fully unified, DX10-compliant, completely scalar architecture but also sports 128 "streaming processors" running at 1.35GHz that can be dynamically tasked for pixel, vertex, or geometry shading duties, a 384-bit memory interface, 768MB onboard memory, and 575MHz and 1.8GHz core GPU and memory clocks, respectively. The GeForce 8800 GTX GPU proved to be an incredibly strong performer, outpacing a pair of GeForce 7900 GTX cards running in SLI mode in some cases.

In addition to its high performance, the 8800 GTX also offers 10-bit display processing, an enhanced PureVideo engine, and new antialiasing and anisotropic filtering modes to improve in-game and video image quality. GeForce 8800 GTX cards do have stringent power requirements (185W max, 12V at 30A), and Nvidia outfitted them with big, dual-slot coolers; but that's what happens when you build a 681 million transistor GPU at 90nm. The GeForce 8800 GTX is simply in a league of its own.

Feast your eyes on the most powerful graphics card released in 2006, Nvidia's GeForce 8800 GTX.

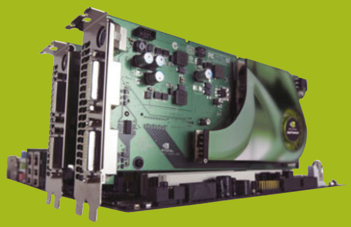
First Runner-Up: Nvidia GeForce 7950 GX2

In June Nvidia put the virtual screws to rival ATI and released what was at the time, the "fastest single graphics card on the planet," the dual-GPU GeForce 7950 GX2. Up to that point,

Biggest Disappointments: Tie, Nvidia Quad SLI & AGEIA PhysX

Nvidia had been teasing enthusiasts with Quad SLI for about eight months before the company officially sanctioned DIY Quad SLI with the release of the ForceWare v91.45 driver suite. The possibility of running four GPUs in tandem with 2GB total frame buffer memory at their disposal seemed like an unbeatable setup from a performance perspective, at least on paper. But when DIY Quad SLI finally hit, incompatibilities and DirectX limitations held it back, and its real-world performance didn't live up to lofty expectations. In many cases, a pair of GeForce 7900 GTX cards running in standard SLI mode were faster than a Quad-SLI setup (and cheaper, too).

Although it's not a GPU, another one of 2006's disappointments is related to gaming and graphics, so we'll lump it in here. AGEIA's PhysX PPU (physics processing unit) spurred the entire industry to begin talking about accelerating physics on a dedicated processor and lit a fire under Nvidia's and ATI's respective rears. But when PhysX cards became available, few games supported the technology, and the ones that did showed very little real-world benefit. ▲



Despite having four G71 GPUs and 2GB onboard memory at its disposal, a pair of GeForce 7950 GX2 cards running in Quad-SLI mode didn't offer the kind of monumental performance gains we were expecting.

the Radeon X1900 XTX and GeForce 7900 GTX had been trading blows on a relatively level playing field. But when the 7950 GX2 arrived, it blew the X1900 XTX out of the water. Powered by a 1GB frame buffer memory and a pair of G71 GPUs running in a SLI, the GeForce 7950 GX2 was the clear performance leader in the vast majority of popular games on the market. To sweeten the deal, it has broad compatibility and works properly on motherboards based on a variety of chipsets. Until the GeForce 8800 GTX arrived, there was no other graphics card that came close to the performance of the GeForce 7950 GX2.

Second Runner-Up: ATI Radeon X1950 XTX

ATI didn't have a dual-GPU powered, single card response for the GeForce 7950 GX2, but it did have something in the works that would clearly outpace Nvidia's fastest single-GPU powered card at the time, the GeForce 7900 GTX.

The Radeon X1950 XTX improves upon ATI's previous flagship Radeon X1900 XTX in virtually every way. The X1950 XTX is the first consumer-level graphics card to feature GDDR4 memory, which ATI clocked at an impressive 2GHz. ATI also redesigned the X1950 XTX's to be nearly silent in all but the most extreme circumstances, and even though performance went up across the board, the card's power consumption is in line with the X1900 XTX. At the time of the X1950 XTX's introduction, ATI also had an advantage over Nvidia with regard to image quality thanks to the R580+ GPU's more flexible antialiasing engine and higher quality, angle independent, anisotropic filtering.

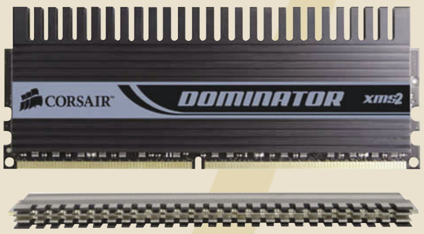
System Memory

In 2006, both AMD and Intel fully embraced DDR2 system memory for the first time. Intel had been using it for years, but it wasn't until Socket AM2 processors arrived that AMD-based systems would require it. And as its popularity increased, prices steadily declined to the point where DDR2 was roughly on par with DDR. There were also some significant advances in 2006 with regard to system memory, thanks to innovators such as Corsair.

Winner: Corsair Dominator TWIN2X2048-8888C4DF 2GB Kit

Our favorite system memory of 2006 is unquestionably Corsair's Dominator TWIN2X2048-8888C4DF. There are a number of things at work in Corsair's Dominator memory kits that make them special. This memory is based on the same PCB used in the company's excellent TWIN2X2048-6400C3 low-latency memory kit. But with the Dominator series, Corsair raised the PCB and used thermally conductive vias and traces that run through the PCB and connect to the ground plane to help dissipate heat from within the board itself. Corsair topped off the package by bonding heatsinks to both sides of the upper portion of the PCB to further aid in heat dissipation.

The memory chips on both sides of the PCB have their own dedicated heatsinks to help cool the chips. Having two paths through which heat can escape the modules is what Corsair branded DHX (Dual-Path Heat Xchange) technology. In addition to DHX, Corsair meticulously binned the memory chips used on the Dominator kits and used only select samples that could operate reliably with low latencies and high clocks. The culmination of Corsair's efforts was an ultra-high-performing 2GB memory kit rated for operation at over 1.1GHz with relatively tight 4-4-4-12 timings.



Corsair's excellent Dominator TWIN2X2048-8888C4DF memory kit features the company's patent-pending DHX technology and support for EPP (Enhanced Performance Profiles).

First Runner-Up: OCZ DDR2 PC2-8000 Platinum Dual Channel 2GB Kit

Whereas Corsair's Dominator memory is the pinnacle of performance at any cost, OCZ Technology's Platinum OCZ2P10002GK PC2-8000 dual-channel DDR2 memory kit represents one of the better values in high-performance RAM. For a little over half the price of the Corsair's Dominators, the $330 OCZ2P10002GK 2GB memory kit offers similar capacity and overclockability. It just needs to run with more relaxed timings to hit those higher clocks. But with a rated speed of 1GHz with 5-5-5-15 timings, that's a minor drawback, considering the money saved.

Second Runner-Up: Super Talent T800UX2GC4 2GB Kit

Our second runner-up for the title of our favorite memory of '06 is Super Talent's T800UX2GC4 2GB dual-channel kit. The T800UX2GC4 modules aren't rated for the same high clock

Biggest Disappointment: Crucial Tenth Anniversary 2GB Kit

There's nothing necessarily disappointing about Crucial's Tenth Anniversary TY2KIT12864AA663 2GB memory kit, but we have to question why a company would commemorate such a milestone with a product rated for speeds roughly half that of some of its competitors' high-end DDR2 modules. Crucial's Tenth Anniversary DDR2 memory looked great, was priced aggressively, and could run with relatively tight timings of 3-3-3-12, but the DIMMs were only rated for operation at 667MHz. We easily overclocked them to 800MHz+, but it was hard to get excited about this when competitors were offering memory that could run in excess of 1GHz for only a marginally greater investment. ▲

Crucial's special edition commemorative Tenth Anniversary DDR2 RAM had tight timings and a competitive price, but its rated speed of 667MHz left it a little lacking.

speeds as Corsair's Dominator PC2-8888 or OCZ's Platinum PC2-8000 memory, but they're still plenty fast at their recommended stock speed of 800MHz. And as an added bonus, T800UX2GC4 kit runs with tight 4-4-3-8 timings. Super Talent's T800-UX2GC4 is also one of the few dual-channel 2GB DDR2 kits available for under $300, so they're a relatively good value, as well.

Storage Devices

By the end of 2006, it seemed that everyone and his mother had amassed gigantic collections of digital music, movies, and photos. And we all needed more space than ever to keep our digital media collections safely archived. Luckily, some new technologies were ushered in over the course of the year that made it easier and somewhat more affordable to store large amounts of data.

Winner: Seagate Barracuda 7200.10 750GB Hard Drive

There are two things that a hard drive can never be in the mind of a power user—too fast or too big. With that in mind, our selection as the top storage device of 2006 is Seagate's excellent Barracuda 7200.10 750GB hard drive. Aside from its storage capacity, the Barracuda 7200.10 750GB employs perpendicular recording technology for increased data density, which positively impacts performance. The Barracuda 7200.10 750GB drive also features a 16MB cache, SATA 3Gbps transfer speeds with NCQ (Native Command Queuing), whisper-quiet acoustics, and a five-year warranty. At about $380, the Barracuda 7200.10 750GB isn't cheap, but you get what you pay for with this drive.

First Runner-Up: Western Digital Raptor WD1500ADFD

The Seagate Barracuda 7200.10 750GB drive is big, fast, and loaded with cutting-edge features, such as perpendicular recording technology and Enhanced G-Force Protection.

Some hard drives had more features, others had much larger storage capacities, but none of them could match the raw performance of our first runner-up, Western Digital's 10,000rpm Raptor WD1500ADFD. At a scant 150GB, the WD1500ADFD is small by today's standards. However, the drive's fast spindle speed, native SATA interface, and aggressive cache algorithms made it the fastest desktop HD available in 2006.

Second Runner-Up: Plextor Slot Load PX-716AL/SW

It's typically hard to differentiate one internal DVD burner from another, but when Plextor introduced the slot load PX-716AL/SW DVD±R/RW drive around the beginning of the year, we were immediately impressed. We know Plextor also introduced a standard tray-loading 18X DVD burner over the course of last year, but the PX-716AL/SW features four times the amount of cache of the newer PX-760A (8MB vs. 2MB) for more reliable burns, and its slot-loading feature is just plain cool. We definitely wouldn't trade the PX-716AL/SW's more advanced features for a slightly faster drive without some serious prodding. ▲

Plextor's optical drives have been winning awards for 25 years, and the PX-716AL/SW is one of its best products yet.

by Marco Chiappetta

Biggest Disappointment: The Ongoing Blu-ray/HD DVD Format War

The first batch of next-generation optical drives for the PC arrived in 2006. Unfortunately, they came while a format war raged between the HD-DVD and Blu-ray camps, and both technologies were marred by prohibitively high prices, intrusive DRM schemes, and lackluster compatibility. The prospect of watching HD movies and storing up to 25GB on a single Blu-ray disc is certainly enticing, and the future promise of eight-layer discs with capacities up to 800GB is downright amazing. But the timing just wasn't right. Luckily, there is some light at the end of the tunnel. Ricoh has announced it has a single blue laser/pickup assembly that could read and write both BD and HD-DVD discs, so there is a chance future products will be compatible with both formats. Until that happens though, the current muddled mess is something we should avoid. ▲

First-generation Blu-ray and HD DVD drives for the PC left a lot to be desired.

cool inputs & outputs

Peripherals That Shined In 2006

As electronic middlemen, peripherals ultimately determine whether the benefits of all those shiny new devices in your PC actually reach you. Casual users can get by with the keyboard, mouse, and monitor that make up this week's bargain bundle, but enthusiasts often seek out devices that offer more than an ordinary computing experience.

Keyboards/Mice

This is a great time to shop for a keyboard or mouse. Manufacturers are going out of their way to develop peripherals that accommodate our needs beyond simply typing text or moving a cursor. In particular, gamers are seeing devices that let them customize the devices to their play styles. Need your mouse to be a little heavier? No problem. Need your scroll wheel to change sensitivity quickly? Done. Want a bunch of extra macro keys? They're yours, for a princely sum. That said, nongamer boards are also maturing, and our top pick for this category is better suited to general home use than to Battlefield 2.

Winner: Logitech diNovo Edge

($199.99; www.logitech.com)

These days, vendors understand that although functionality is critical, it's not the only issue many of us consider when we buy a board or mouse. Customers often weigh style heavily when they look at PCs, so it's no surprise that they also consider style when shopping for peripherals. The super-thin Logitech diNovo Edge is a quality keyboard that boasts some neat controls, but there's no doubt that Logitech put some serious thought into this board's coolness factor. From its aluminum wrist rest to its piano black acrylic board to its bright orange LEDs, the keyboard screams style.

Beyond its looks, the Edge offers great key resistance (thanks at least in part to a feature that spreads force evenly across the key) and a top-notch touchpad that rivals any notebook's touchpad. Special scrolling controls and a touch-sensitive volume control, both of which make great use of the orange LEDs, also caught our attention. Logitech released the Edge only recently, so check out our review on page 29 to learn more about the board's perks.

First Runner-Up: Saitek Eclipse

($59.95; www.saitekusa.com)

If you haven't yet typed on a Saitek Eclipse keyboard, you're missing out. Although the board's unusual shape and

Logitech diNovo Edge

bright lights appeal to gamers and modding enthusiasts, anyone can enjoy the keys. Key resistance is critical, even if you don't use your keyboard for hours at a time. Stiff or sticky keys throw off your rhythm, and keys that don't offer enough resistance inevitably jar your fingers, especially if you have a tendency to pound the keyboard. The Eclipse is responsive, but not stiff.

We also like the backlighting, which sets the entire keyboard aglow. Thanks to laser-etched key characters, the light actually shines through the keys. If you tend to game in the dark, you'll appreciate this feature whenever you need to reach for a rarely used key.

Even the wrist rest has a user-friendly design: You can pull the rest away from the keyboard without detaching it. Players who invest hours at a time into their games will appreciate the ability to customize the wrist rest. Saitek also offers the Eclipse II, which adds a choice of different backlighting colors, but doesn't have the same unusual keyboard frame.

Second Runner-Up: Logitech G7

($99.99; www.logitech.com)

Logitech's G7 Laser Cordless Mouse also makes one of our top picks, as the lead dog in Logitech's established G Laser Mouse pack. The wireless G7 boasts special gliding feet, a programmable tilt wheel, and a laser that supports 400, 800, and 2,000dpi resolutions. It also has dual battery packs and a charging dock that powers up one battery while you use the other.

Over the past few years, Logitech has developed a stable of gaming mice that offer some customization and provide true in-game advantages. Although Logitech isn't the only manufacturer that offers on-the-fly resolution changing (for those moments when a slower mouse helps your sniper hold the crosshairs on your target), the comfort and carefully placed extra buttons make these mice great gamers.

Monitors

Even our techie daydreams aren't always this good: Not only are the days of clunky CRTs fading rapidly into distant memory, but flat-panel monitors and TVs are growing in size and dropping in price at a quick clip. We're seeing widescreens, which offer support for 16:9 or 16:10 aspect ratios and let you place larger application windows side-by-side, take up a growing amount of monitor shelf space in retailers.

Winner: UltraSharp 3007WFP

($1,274; www.dell.com)

Everything about this monitor is big: big screen, big price tag, and big bandwidth. The monitor actually requires a dual-link video card, as older cards that have single-link ports simply can't keep up with this beast. The 30-inch Dell UltraSharp 3007WFP that we use to test Quad-SLI systems positively dwarfs the other monitors in our labs.

UltraSharp 3007WFP

Dell's king-of-the-hill display isn't the only 30-inch behemoth on the market. Apple's 30-inch Cinema HD Display took the 30-inch crown first and also offers a 2,560 x 1,600 resolution, but the 3007WFP boasts a significantly lighter price tag at $1,274 to the Cinema's $1,999. Apple usually clobbers other manufacturers in the aesthetics department, but here the 3007WFP's clean, black-and-aluminum look competes head-on with the Cinema's all-aluminum chassis.

The WQXGA widescreen monitor supports resolutions up to 2,560 x 1,600, which is the sort of resolution you'll want to have available when you fire up your Quad-SLI system. At 400 cd/m2, the monitor is reasonably bright. It offers a 700:1 contrast, an impressive 11ms (grey-to-grey) response time, and a 0.2505mm dot pitch. The 3007WFP can tilt forward and backward and turn left or right and can raise or lower enough to accommodate your seat height. However, you can't rotate the display without modifying the default stand assembly.

Other (if minor) pluses include the monitor's built-in media card reader and four USB 2.0 ports (two near the media reader on the side of the system and two at the back of the monitor). The base warranty is better than you'll find for most computers: a three-year warranty that includes Dell's Advance Exchange service. You can extend that warranty to five years for an extra $67.

First Runner-Up: BenQ FP241W

($1,099; www.benq.us)

BenQ's 24-inch FP241W doesn't have the overwhelming size factor that Dell's 3007WFP has, but we're impressed by this flat-panel display nonetheless. It offers some noteworthy features and has a slew of input options that make it a great fit for any electronics lover's home office.

High-end monitors boast very short response times, but the FP241W's 6ms grey-to-grey response time caught our attention right away. The monitor is also very bright at 500 cd/m2 and offers a 1000:1 contrast. The widescreen display supports a WUXGA resolution of 1,920 x 1,200. On the input side of things, the monitor supports component, composite, DVI-D, D-Sub, and S-Video, which means you can connect other entertainment devices, such as your gaming console. It also offers an HDMI interface and supports up to 1080p HD. Although the FP241W has an MRSRP of $1,099, we've seen as low as $799 at reputable online retailers, which makes it competitive with Dell's 24-inch UltraSharp 2407WFP.

Second Runner-Up: ViewSonic N2060w

($459; www.viewsonic.com)

ViewSonic's N2060w makes a great dorm room monitor that doubles as your TV, thanks to a built-in NTSC TV tuner. The widescreen LCD TV offers 20 inches of high-definition TV viewing screen area and has a decent 700:1 contrast ratio. Although the monitor can't match our other picks' resolutions (the N2060w tops out at 1,366 x 768), it's quite bright at 450 nits and boasts an 8ms grey-to-grey response time. The TV includes cable, composite, component, D-Sub, and S-Video inputs and supports 480i, 480p, 720p, and 1080i. The two 3W speakers provide audio in a pinch, and the monitor also has a 3.5mm audio in/out jack. At $459, the N2060w LCD TV makes for a pretty good deal.

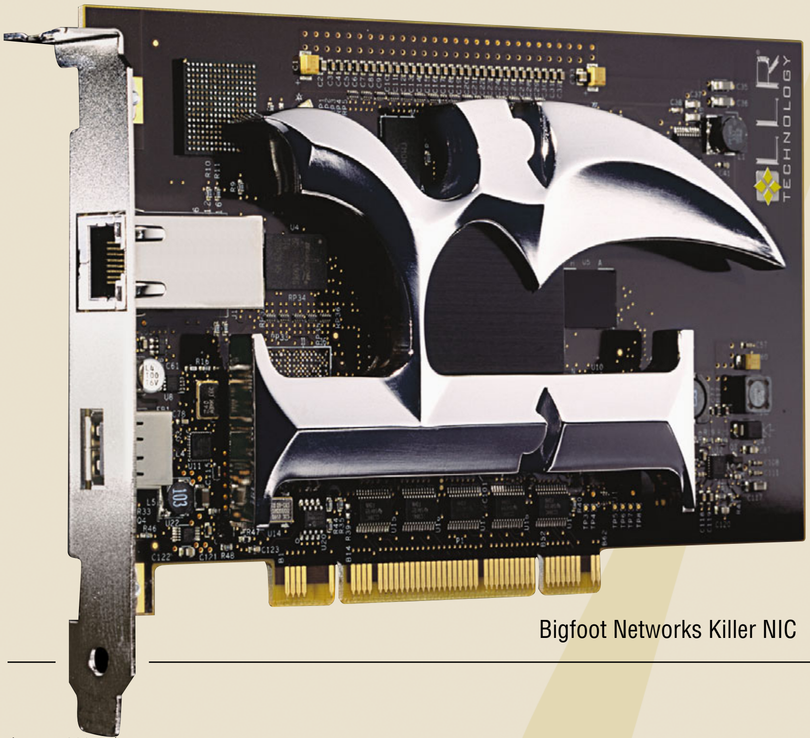
Networking Devices

We wish we could say that most of today's newest wireless network equipment won't cause you the headaches that previous gear induced. Wireless manufacturers are pushing 802.11n gear (802.11n is still in draft form, as the IEEE won't ratify the standard until as late as 2008), with promises of great bandwidth and ranges that far outreach the existing big cheese, 802.11g. As it stands, we can't say that draft 802.11n is all it's cracked up to be: After reviewing several draft-n routers recently ("The Draft-n Debacle," November 2006 *CPU*, page 16), we didn't find any that really wowed us. That's not to say that the 802.11n won't be a solid choice down the road, but this year, we've found other noteworthy equipment.

Winner: Bigfoot Networks Killer NIC

($279.99; www.killernic.com)

We're proof that high-end PC gear can't completely make up for poor aim and minimal talent, but there's no question that said gear and your Internet connection do make a difference. Lag slows the action on your screen compared to what's really happening in the game's virtual world, creating a disadvantage for your character. If you've ever experienced really bad lag, you know the frustration of being shot down by other characters who are far faster than you.



Bigfoot Networks Killer NIC

Your computer's components in general (and graphics card in particular) shoulder much of the responsibility for your system's gaming performance, but your network connection also plays an important role. Dial-up connections can't keep pace with many of today's online games and create comical situations in first-person shooters. Broadband Internet connections give you a fighting chance, but you'll still be envying the single-digit pings of players who have faster connections to the game server. Bigfoot Networks helps even those odds with its Killer NIC, which is a network interface card that prioritizes gaming data to lower your lag.

Bigfoot's Killer NIC NPU (Network Processing Unit) cuts the card out of the standard path data follows during the game to smooth graphics. The card skips the Windows network stack, which lets it move data more quickly during gaming. It also takes over some work from the CPU. As a result, the card improves frame rates and lowers pings.

Of course, you may find yourself in situations where you want to raise your ping to put yourself on an even playing field with your friends. To that end, the card offers a Ping Throttle feature, which lets you add about 20ms to your ping via the Killer NIC.

Killer NIC is flashy, thanks to a stylized, aluminum "K" heatsink (which has nickel plating that adds bling), but the components are much more serious: a 400MHz processor and 64MB DDR memory. The PCI card also boasts a Gigabit Ethernet port, giving it the flexibility to any network you're likely to encounter.

First Runner-Up: D-Link DSM-520 MediaLounge Wireless HD Media Player

($249.99 www.dlink.com)

If you're looking for a way to stream media files on your living room TV and speakers without investing in a new media center PC, D-Link's MediaLounge may be the way to go. The media player connects to your 802.11g network and streams the files from your computer to your TV and speakers (it can also connect via an Ethernet cable if you've got a computer nearby). The player has component, composite, HDMI, and S-Video video outputs and coaxial and optical audio outputs. It works with Windows XP SP2 PCs.

Second Runner-Up: WD WDXE5000KS NetCenter

($399.99; www.westerndigital.com)

Network-attached storage is migrating from the business to the living room. If you're looking for an easy way to make files consistently accessible to other systems on your network, Western Digital's networkable, external drive can do the job. It includes a 500GB, 7,200rpm hard drive and connects to your wired or wireless router via a 10/100 port. The drive supports DHCP for IP assignment and supports the CIFS open-platform file-sharing protocol. The drive includes EMC Retrospect Express backup software and even boasts a print server.

Printers

Although printers don't grab the peripheral limelight that monitors, keyboards, and mice hold, some industry trends make the market worth a closer look. For one thing, printer manufacturers continue to pump photo printing capabilities to meet the demand of users who switched to digital cameras without giving up their love of real photos. These printers offer more than convenience: They create high-quality, long-lasting prints. Users sometimes buy two printers: one that has advanced photo printing features and another that offers speedy text output.

Another trend is the steady decline of printer prices. You can still break your wallet on a heavy-duty, all-in-one device, but you can also find inexpensive inkjets that produce quality photos. Many laser printers also carry affordable price tags.

Winner: Epson Stylus Photo R380

($199.99; www.epson.com)

The R380 is a jack of all (photo-printing) trades. It can print pictures directly from your printer or your phone, and it can print onto paper or a CD. It even has built-in photo-editing features. Although we weighed features much more heavily than prices when choosing the picks for this article, we appreciate the low price that accompanies this feature-laden printer.

If you agonize over picture quality, you'll like Epson's Ultra Hi-Definition print technology, which uses Claria ink and a special print head that can create small ink droplets. Each nozzle also releases multiple droplet sizes to create smooth gradations. The R380 can print borderless pictures on 4x6, 5x7, 8x10, and 8.5x11 paper sizes and offers optimized resolutions of up to 5,760 x 1,440dpi. The printer has a tray that supports 8cm and 12cm CDs and DVDs.

You can attach the printer to your computer, but you won't need to if you want to print pictures from your camera and plan to make only minor edits. The printer has a built-in media card reader and a PictBridge port that lets you print from a digital camera or a mobile phone that has a camera. However you input the photo, you can see and edit the pic via the 3.5-inch LCD. You can crop or rotate the pic and take advantage of its automatic red-eye removal and color and lighting correction utilities. Not bad for less than $200.

Epson Stylus Photo R380

First Runner-Up: Canon PIXMA MP960

($399.99; www.usa.canon.com)

Canon's MP960 all-in-one printer takes advantage of its scanner to give you several print-without-a-PC options. Although the scanner can handle scans of standard pages, its real claim to fame is its ability to scan photos, slides, and photo negatives into 4,800 x 4,800dpi pictures for printing. As with Epson's R380, the Canon printer includes a 3.5-inch LCD that lets you view your photos before printing.

Its MP960's color print speed is 22ppm, whereas its black print speed tops out at 30ppm. The printer also has a media card reader and PictBridge port and supports Bluetooth if you add the optional BU-20 adapter ($79.99).

Second Runner-Up: HP Color LaserJet 2605dn

($499.99; www.hp.com)

The HP 2605dn has a 300MHz CPU and 64MB of memory, making it a solid workhorse for your home office. It has a 250-sheet paper tray and can handle two-sided printing for your brochures or other documents. A small, built-in LCD lets you check the print status at a glance. The printer supports black and color printing (12ppm and 10ppm, respectively) and uses HP's ImageREt 2400 technology to smooth jagged edges in pictures.

The feature that makes the 2605dn really stand out in the crowd is its built-in print server and 10/100 network connectivity. You can plug this printer into your network and share it with the rest of the family without relying on an always-on PC. ▲

by Joshua Gulick

exceptional executables

Applications That Sang

Integration was the reigning principle in software design this year. Look at any of the categories in the coming pages, and you'll see a lot of software yearning to be something more than itself. Security programs became nannies, with some protecting our kids from inappropriate sites. Multimedia packages, already stuffed fatter than the holiday bird with features, also wanted to make ringtones for us and even slap on IP telephony. Oh, and those system utilities? Now they want to be security programs, too. If you aren't careful, you could end up with three firewalls, a couple of spyware shields, and a handful of CD copying programs, all from different software suites.

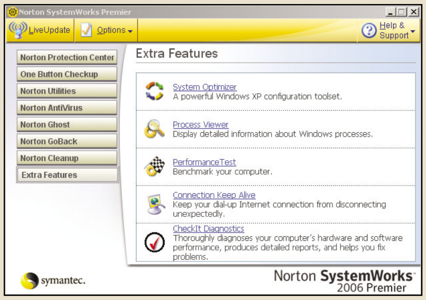
Not that we're complaining, mind you. We love the added value this year's crop of top programs brings to the table. You may have trouble deciding which piece of which suite you want to control viruses, stop spies, block pop-ups, or back up your system, but we doubt that you'll feel ripped off by any of the gems we found in 2006.

System/Drive Utilities

So much freeware and dirt-cheap shareware has become so good at tweaking and cleaning Windows XP, we wondered if there was any room left for retail toolsets typically jam-packed with features. This year, the traditional utilities companies came through by consolidating their lines into far-reaching suites that even started absorbing major categories, such as security.

Winner: Norton SystemWorks Premier

($99.99; www.symantec.com)



Extra Features

System Optimizer
A powerful Windows XP configuration toolset.

Process Viewer
Display detailed information about Windows processes.

PerformanceTest
Benchmark your computer.

Connection Keep Alive
Keep your dial-up Internet connection from disconnecting unexpectedly.

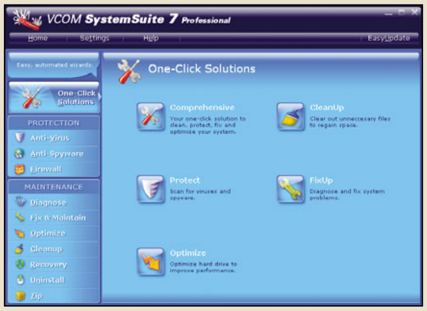
CheckIt Diagnostics
Thoroughly diagnoses your computer's hardware and software performance, produces detailed reports, and helps you fix problems.

The mother of all all-in-one utilities may best be suited for monster rigs. Like many Symantec/Norton products, this one can feel like it is taking over a piece of the operating system with its comprehensive suite of shields, backup, cleanup, performance, and diagnostic tools. Symantec rebuilt many of the components this year, and to good effect. Everything Microsoft keeps forgetting to include in Windows is here. Symantec virus and spyware shields make it a bargain out of the gate. But full versions of Norton Ghost and GoBack also give you disk imaging and roll back tools you need to ensure that your data is protected. GoBack even gives you access to previous versions of documents.

But wait; there's so much more. We really like the Registry cleaner and the thorough way the cleanup routines find unnecessary clutter. The unerase tools help us back out of our accidental deletions. The suite maintains a repair history so you can recall past fixes. Nothing is as thorough in diagnosing a Windows system as Norton. The Process Viewer peers into every operation running on your rig with stunning depth, and the disk diagnostics are as thorough as always. On top of everything else, a System Optimizer takes its cues from shareware such as X-Setup Pro (our runner-up) by letting us toggle many of the interface settings and little irritants that can make Windows so, well, irritating. Although we wish SystemWorks loaded its many elements faster (it can also add to boot and shutdown times), it is remarkably unobtrusive for a toolkit this comprehensive.

First Runner-Up: vCom System Suite 7 Professional

($59.95; www.v-com.com)



One-Click Solutions

Comprehensive
Your one-click solution to clean, protect, fix and optimize your system.

CleanUp
Clear out unneccesary files to regain space.

Protect
Scan for viruses and spyware.

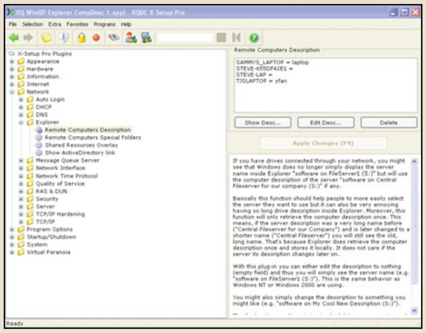
FixUp
Diagnose and fix system problems.

Optimize
Optimize hard drive to improve performance.

Among the all-in-one system cleaners and maintenance programs, we like System Suite 7 for its unexpected extras. Yes, it has one of the best Registry cleaners we've seen, strong disk diagnostics, and even a security suite tossed in to make it one of the most comprehensive bargains in the category. But we love its ability to move applications between PCs, delete unneeded ActiveX add-ons, take a snapshot of core system files, and scan your system settings and components as thoroughly as many standalone programs. Now that most utility suites are cleaning files and Registries well enough, it's these little extras that make a program like this shine.

Second Runner-Up: X-Setup Pro 8

($14.95; www.x-setup.net)



1,900 (count 'em) tweaks in a database so vast it comes with its own search engine. It's hard to imagine a Registry adjustment, an interface customization, or a performance enhancement that X-Setup Pro doesn't enable with a simple toggle. You can even record your tweaks to a .REG file and import them to another PC. From maximizing AGP compatibility on AMD machines to simply turning on auto-logon, nothing covers the sublime to the ridiculously simplistic as thoroughly as X-Setup Pro 8. X-Step Pro 9, which will have support for Vista, is forthcoming.

Security Apps/Suites

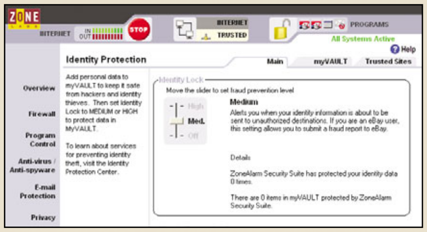
Biggest Disappointment: Microsoft Windows Vista

We admit that it's pretty hard to find a big disappointment this year, but why aren't more of these third-party utilities simply a standard part of the OS? From what we've seen of the release candidates, disk defrag and backup stay pretty much the same as WinXP, and there are too few new maintenance utilities to notice. Would it kill Microsoft to include a Registry cleaner? When will the company give us an OS that actually cleans up after itself? ▲

Rootkits and drive-bys and phishing, oh my! Security software had to up its game this year, as malware writers and hijackers were ever more ambitious in 2006. Most antivirus programs and security suites began incorporating rootkit detection, tools for deflecting identity thieves, and safeguards against any personal information flowing off of your computer without your consent. Microsoft entered the security game with mixed results. Its Live OneCare seemed half-hearted (see sidebar). Worse, Microsoft ticked off both Symantec and McAfee when it decided to limit third-party access to Vista's kernel. As the year neared its end, the security software companies were still complaining publicly that Microsoft was blocking them from making the best security programs for Vista.

Winner: ZoneAlarm Internet Security Suite

($49.95/yr; www.zonelabs.com)

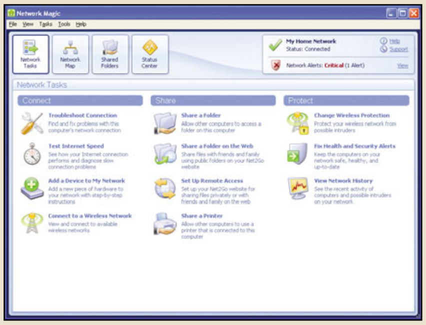


It should be said that the major security players—Symantec, McAfee, and Trend Micro—all released stellar updates this year that provide excellent protection and usability. But we continue to find that ZoneAlarm's integrated suite of safeguards against viruses, worms, spyware, and identity theft is especially well-suited to PC enthusiasts like us. It has the usual full monty of shields for viruses, spyware, and ID theft but also instant messaging security and parental controls—all very clearly explained. We love that Zone-Alarm gives us such a high degree of control with little noticeable system overhead or intrusion.

It takes a layered approach to the UI, letting you drill from simple toggle switches down to highly granular control of every operation. The "Zone" approach of organizing security into Internet, Trusted, and Blocked areas lends clarity to the process. Managing exceptions, quarantine areas, and security settings is a breeze. And frankly, we just love version 6.5's Game Mode, a one-click toggle that suppresses alerts, scans, and background updating for unimpaired gaming. ZoneAlarm knows how to play.

First Runner-Up: Pure Networks Network Magic

($29.99 and up; www.networkmagic.com)



Because home networks may be the next battleground of security, this is the best and easiest product we have seen for monitoring and troubleshooting a network. It also lets you block wireless intruders and control any PC's internal or external access privileges. Network Magic does what we hope security suites or Windows itself eventually will do, and, Symantec announced that it would start distributing Network Magic.

This tool maps the local network and gives us greater freedom and ease to exchange information within a secure environment, access a network remotely, and share resources. Although we would like to see support for Linux and Mac machines, and it still has usability glitches, Network Magic is off to a great start. Security isn't just about lockdown. It's about freely, easily, and fearlessly managing data within our home network.

Second Runner-Up: WebRoot SpySweeper 5.2

($29.95; www.webroot.com)

In our experience, SpySweeper captures more potential threats than any solution we have used, even now that most security suites include built-in spy guards. Its world-class research labs have a

finger on spyware networks. The memory-resident program is low-overhead and unobtrusive. It explains every process and option clearly and gives stellar control over Internet Explorer security and our startup programs. For spyware protection, we still like the added security of a standalone superstar like this one.

Media File Applications

Biggest Disappointment: Microsoft OneCare

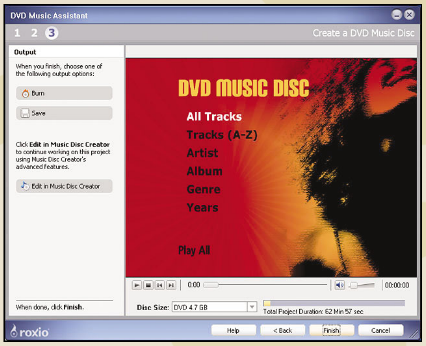
($49.95/yr; www.windowsonecare.com)

Despite a three-month free trial and built-in PC tune-up operations, this first attempt at a managed online security service from Microsoft is a confusing patchwork of existing Windows capabilities (firewall, backup) and new ones, such as the Windows Defender spyware shield. An unclear interface and apparently evolving features make OneCare less convincing than many freeware alternatives. ▲

The proliferation of PMPs, such as the iPod video and PSP, the introduction of high-definition disc formats, and HD camcorders hitting the market with force all challenged media software companies to keep up in 2006. Already bloated with features, the Nero and Roxio suites accommodated these new needs in their upgrades and even pointed toward the next frontier—mobile media. Microsoft and Apple positioned themselves for the Zune-iPod smackdown we'll be talking about in '07, and Windows Media Player 11 and iTunes 7 brought the portable AV playback wars to a new level. But amidst all of this big-brand brawling for multifunction software dominance, we were relieved to find a couple of programs that satisfied very specific media-making and organizational needs exceptionally well. The suites are still sweetest, but we true media mavens really need dedicated tools that drill deep.

Winner: Roxio Easy Media Creator 9

($99.99; www.roxio.com)



When you finish, choose one of the following output options:

Click **Edit in Music Disc Creator** to continue working on this project using Music Disc Creator's advanced features.

When done, click **Finish**.

Disc Size: DVD 4.7 GB

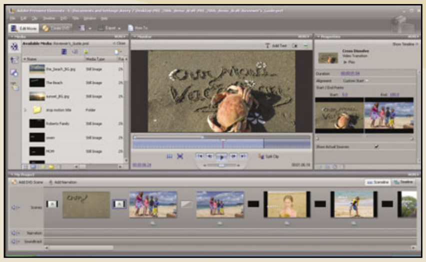
Total Project Duration: 62 Min 57 sec

As *CPU*'s review found last month (see page 73 in the Dec. 2006 issue), you can't go wrong with either Nero 7.5 Ultra Edition or Roxio super suites, but Roxio won our hearts with Easy Media Creator 9. We found that it takes a fast machine to really make it sing, but the video-editing combination of MyDVD, VideoWave, and CineMagic gave Easy Media Creator 9's movie deck the depth of a standalone program. The interface nicely integrates scores of media burning and editing functions, and there are lots of helpful wizards for novices.

Some of this suite's additions may seem odd, but a ringtone maker for phones and easier music DVD authoring were very handy. The fluid media conversion for iPod/PSP formats was invaluable because now we could output video projects to portable formats. For those who like depth and flexibility as well as great breadth, EMC9 stands out this year.

First Runner-Up: Adobe Premiere Elements 3.0

($99.99; www.adobe.com)



If this is the stripped-down version of Adobe's high-end video editor/burner, we're scared to see the Pro version. Hands down, Premiere Elements has more video effects and editing flexibility than any program we've seen. Its new, available Sceneline interface simplifies the Time-line structure and makes applying an enormous library of titles and effects much easer. The program brilliantly anticipates your workflow and quickly gives you the tools you most likely need to make professional-level video. And now it can output directly to iPod/PSP and even 3GP (phone) formats. The program's depth reminds us why we still need standalone specialists in a world of media super-suites

Second Runner-Up: Media Monkey 2.5.4

(Free [Standard], $19.95 [Gold]; www.mediamonkey.com)

We're going to climb out on a limb a bit and spotlight the MediaMonkey. As our digital music collections grow, we want this software on our machines. MediaMonkey is better than anything we've used for browsing, mass tagging, converting, and playing large libraries. From the way it lets us search and tag files to the way it segregates incomplete tags and dupes for editing, this program knows how music nuts work with their collections. The Monkey's interface is a bit scruffy (for example, the player window and some type can be exceedingly small), but for burning, tagging, and shuffling thousands of tracks and albums, this primate swings.

Miscellaneous

The line between standalone software and the Web blurred substantially this year as Google, Microsoft, and Yahoo! all vied to bring more of the usual desktop duties online. Google's Docs & Spreadsheets lives

Biggest Disappointment: iTunes 7

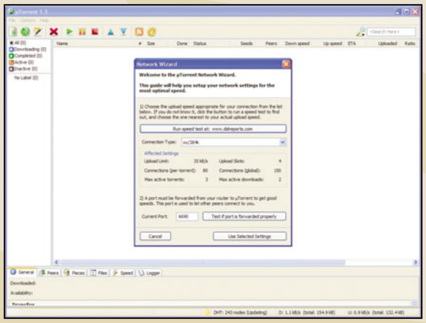
Although we loved the steps Apple took to patch glaring holes in iTunes, especially the option to cull album art from the Music Store for ripped CDs and much-improved video resolution, early bugs (and some that persist, even after quickie updates) are highly aggravating. iTunes 7 also lacks media conversion and the media burning flexibility of Roxio and Nero. The upgrades, though substantial and positive, still send us to third-party software. Here's hoping the Apple will produce better media *management* software in 2007. ▲

in a browser window but acts like full-blown applications. Yahoo!'s Web-based email service has all the drag-and-drop interactivity of Outlook. A number of smaller projects such as Glide, Backpack, and Sharpcast are working to integrate the Desktop with the Web and, at times, our mobile applications.

And of course there were the widgets—the calendars, timepieces, headline tickers, *ad absurdum*—from a range of publishers that continue a never-ending quest to make Windows feel like a Mac. The OS is becoming the Web, and the Web is becoming an operating system.

Winner: µTorrent

(Free; www.utorrent.com)



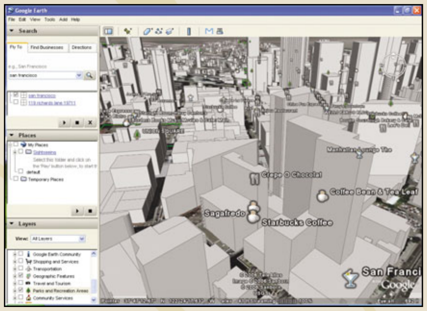
Even more people jumped on the torrent bandwagon this year, as a flood of open-source clients burst into the freeware channel. Everyone has his favorite BT variant, but we found ourselves sticking with µTorrent this year as one of the most stable and versatile programs around.

Combining some of the best of BitTorrent and the feature-laden Azureus, µTorrent packs a lot of information in a single screen and gives the user tremendous control of each torrent before and after downloading. The integrated search tool queries multiple torrent engines, and the RSS reader can pull torrents out of feeds. Perhaps the best part of µTorrent is that it is evolving under the excellent stewardship of developer Ludvig Strigeus. Several versions were released in 2006, and a new WebUI beta lets users access and control their µTorrent client from the Web. Plus, this is among the leanest of clients, using only a small amount of system resources to stay resident.

This is one BT client that is keeping its eye on user needs and the evolving habits of the downloading community.

First Runner-Up: Google Earth 4 Beta

(Free; earth.google.com)

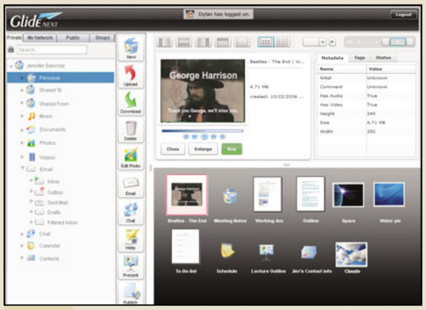


This is the most fun you can have with your overpriced graphics card without booting Oblivion. Google Earth mashes up search and mapping into an entirely new experience. From measuring distances to finding the nearest Starbucks, Google Earth is a blast to use. The wealth of overlays from the Earth community as well as publishers and organizations make any spot on Earth come alive with information. This is the globe on steroids.

Second Runner-Up: Glide Effortless 1.3

(Free [300MB storage]; www.glidedigital.com)

Among the many attempts this year to turn the Web into an operating system, Glide is an amazing achievement in integrating the Desktop into a browser. Not only can you upload images, videos, documents, and music to the service but also view, manipulate, and share them from anywhere. It does amazing things, such as stream videos and MP3s from the online interface, and a new downloadable tool called Glide Sync synchronizes Glide and Desktop folders. There is even a built-in online word processor. We're anxiously awaiting Glide 2.0, which should be available as you read this.



Biggest Disappointment: Desktop Search

The search box is the undisputed interface for the Internet, but many of us are still waiting for a convincing execution of Desktop search to take hold. Sure, Google, MSN, Yahoo!, and even Copernic Desktop Search solutions have their devoted fans, but this once-promising category never seemed to break out into general use. Although useful for many of us, Desktop Search awaits someone to produce a killer version that makes a case for the genre. Vista will try again by putting a query box right on the Start menu. Good luck with that. ▲

Open Vistas

There was a great deal of value in this year's crop of software, but how will the security, multimedia, and utility standbys hold up in a Vista-driven Windows world?

You'll just have to wait and see, but you know that we'll be back next year with another collection of system utilities. ▲

by Steve Smith

who's got next?

PC Parts To Look Forward To

Welcome to 2007. Out with the old, in with the new, right? Core 2 Duo—time for a "du-over." And GeForce anything that starts with a 7 is no longer the "it" of 3D IT. If Santa didn't sufficiently pimp your PC, then you have to be wondering what cutting-edge gear is lying in wait to drain your tech budget over the next few months. What are the key pieces you're going to crave for your machine before next summer?

As you might expect, getting answers isn't point-and-shoot simple. Manufacturers have this annoying habit of keeping their best news under wraps until the last possible moment. Still, we approached reps for five of the key players and did a little extra Web digging to make sure they were shooting straight with us, and here's what they said we could look forward to.

Intel's Quadrophilia

By the time you read this, Intel's quad-core Core 2 Extreme (formerly known as Kentsfield) will have been out for more than a month, but it will probably still have that $1,000 Intel flagship price tag attached to it. By New Year's, you should have had the first inklings of whether Intel's single-chip, "quasi-quad" approach will beat out AMD's 4x4 architecture—essentially a 2P, dual-core, Opteron-like setup on a desktop motherboard—due to arrive well before AMD's own "true" quad-core Athlons. We're not placing any bets on brand superiority today, but we do know that quad-core Core 2 Extreme and its forthcoming mainstream parts blow away all other modern processors, provided you're doing substantial multitasking or running multithreaded software.

We use the term "quasi-quad" to reflect critics' mumblings that Intel's current quad-core parts are merely two Core 2 Duo dies stuck together in the same processor package. Critics say this design seems to lack the elegance and efficiencies that distinguished the integrated Core 2 Duo from the twin-die Pentium D MCM (multichip module) design, never mind the other architectural advances specific to Core 2 Duo. Having four Core microarchitecture dies share an optimized 8MB of L2 cache will doubtless prove superior to quad Core 2/Extreme's 2 x 4MB design, which requires additional arbitration between the two memory blocks. In fact, Intel road maps already show such a design (Bloomfield) sitting on the sidelines, keeping warm for when Intel transitions to 45nm fabrication from today's 65nm process. From Bloomfield, you can guess the next step: Yorkfield, a dual-Bloomfield MCM with 12MB of L2 cache projected for each die.

But now we're looking way beyond next summer. The immediate question is whether there's a Kentsfield in your near future. "Currently the quad is geared toward gaming enthusiasts," says Intel spokesman Dan Snyder, "the hard-core video encoding guys and people who are ripping loads of audio. A lot of games are being written to take advantage of quad, too. The cost of this 'true quad wonder' is a little steep, with the average system being around $2,500. However, by early January, that will come down to the mainstream, and a system will only run you about $999—probably in the $200 to $500 range just for the processor."

When we spoke with Snyder about Bloomfield, he said, "In reality, the speed trade-offs are very minimal." When we asked about rumors of Intel's frontside bus architecture bottlenecking when more than six Core dies are pushed through it, he answered, "We showed lots of data at IDF showing that even at peak loads, the frontside bus is nowhere near saturated."

So the official word seems to be that next summer's blockbuster processor is already out. You probably just can't afford it yet.

Corsair Sails Through Memory

The bad news is that it looks like there won't be a switch to DDR3 before the second half of 2007. The need for DDR3 doesn't really become pressing until you reach 1,333MHz, which is the next bus speed step above quad Core 2's present 1,066MHz. (Early Web reports on Kentsfield showed the chip with a 1.3GHz FSB, so it's a fair guess that Intel eased back on this and is holding 1.3GHz in reserve either for subsequent Extreme models or, more likely, Bloomfield.) Because the only way to reach 1,333MHz today is with some fancy BIOS footwork, there's no real reason for the industry to push DDR2 aside prematurely. As Corsair, OCZ, and others are proving, DDR2 has plenty of headroom to take us all the way through 2007.

So what do the next few months hold for high-end DDR2? You don't have much farther to look than Corsair's fresh Dominator design. You already know that Corsair's Micron D-based XMS2 modules, and the 6400C3 sticks in particular, offer today's highest speeds at the lowest voltages and overclock like mad fiends. Then what do you do for an encore? Why, push overclocking even further with next-gen cooling techniques in the new Dominator series.

Dominator modules are different from previous modules on the market because they dissipate heat through two thermal paths. Rather than only stick heatsinks to the RAM modules with some thermal tape, Dominator DIMMs add a second set that pulls heat through the BGA modules and into the PCB. A significant amount of heat uses this path, according to Corsair, because it's completely metal and thus offers low thermal resistance.

"To take this thermal performance even further," says John Beekley, Corsair cofounder and vice president of applications engineering, "we have engineered extruded aluminum heat spreaders for the RAMs and the PCB and developed an optional airflow unit to provide additional airflow to the modules. The result is a reduction of 17 degrees Celsius, which results in substantially improved overclocking."

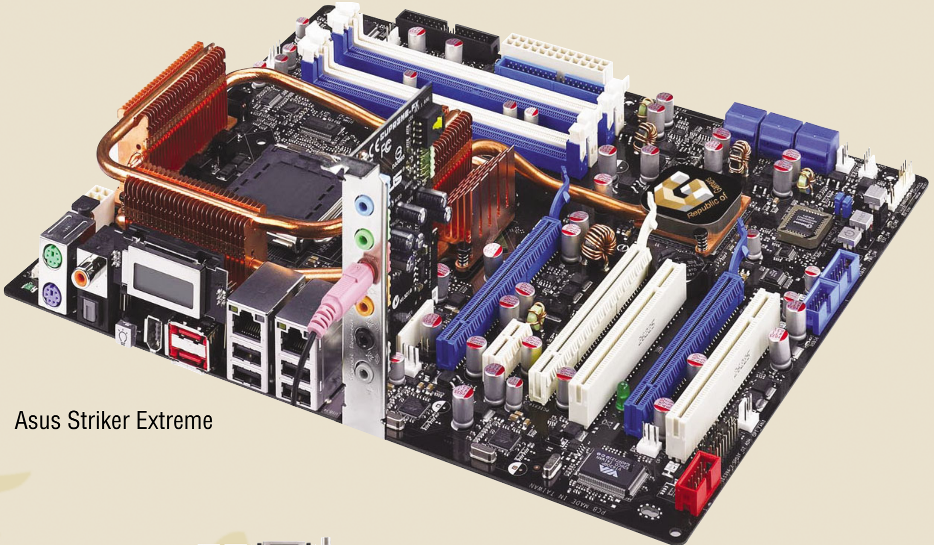
We all know that the chief risks of heavy overclocking are data errors and lower component lifespan. Beekley feels that the superior cooling ability of this DHX (dual-path heat xchange) approach keeps memory safe and reliable even as you push it to the limit. Expect many Dominator models for overclockers and performance users in the coming months.

Asus Mods The Motherboard

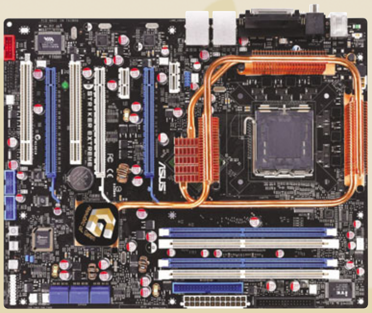
Although Abit, Gigabyte, MSI, and others continue to do some amazing things with their motherboards, no one can match Asus' track record for pairing blistering performance with excellent stability and eye-popping bonus features. We went to Asus with hopes of being dazzled by its six-month forecast. Instead, we were pointed to the just-released Striker Extreme motherboard. At first, we felt a bit blown off, but upon closer examination, we saw that the Striker Extreme probably contains every last high-performance bell and whistle Asus had in its

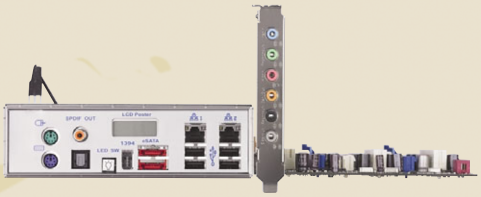
Security In A Flash

We're already big fans of Corsair's ultrafast, rubberized Flash Voyager USB drives, but this device category is a tough one in which to innovate. Everyone already does "secure" flash drives with encrypted memory areas protected by passwords. Corsair thinks it can do better with a new feature called PadLock, which should be shipping early in 2007. This lets you apply a PIN code to the drive. Once set up, you enter the PIN on the drive and have about 30 seconds to insert the unlocked device into a USB port. Without the PIN, the device won't register on the PC. No finicky fingerprint scanning, no susceptibility to brute force attacks by hackers. For those into data protection, PadLock seems a sure winner. ▲



Asus Striker Extreme





Asus W5Fe Notebook

orchestra, all pushed into one design and out the door for the holiday rush.

Without question, the eight-phase power Striker Extreme, poster child for Asus' new ROG (Republic Of Gamers) family, is a wonder to behold. Copper heatpipes and radiators form a square around the LGA775 socket and reach out to cover the north- and southbridge chips. Nvidia's top-end nForce 680i SLI chipset fuels three PCI Express graphics slots in anticipation of SLI marvels both here and coming. The board is ready for quad-core and supports a 1,333MHz FSB.

Asus wants to trumpet its SupremeFX audio card and bundled noise-filtering Array Microphone, but we've seen such extras for a while now. The only real justification we can see for tying up a slot with a 7.1 audio card is to leave room behind the I/O shield for things such as two eSATA ports (which we expect will become popular soon); two LAN jacks; the new LED "poster" screen that shows board diagnostic info so you don't have to pop the case cover off to troubleshoot; and the LED switch, which sets the backplane aglow so you can more easily plug in cabling during a dark LAN party. We wouldn't call these features technology breakthroughs by any stretch—nothing like the Windows Vista SideShow auxiliary display on the side of Asus' coming W5Fe that lets you access contacts and email without entering the operating system—but it shows Asus making the absolute most of the hand it was dealt by Intel and Nvidia. If quad-core is in your future, we couldn't recommend a more forward-looking board on which to showcase it.

Nvidia Gets 10 From 80

Once again, the preholiday push stole some of our thunder. Post-AMD merger, ATI is still in lockdown with R600 until at least early 2007, leaving Nvidia alone and unchallenged with its fresh G80 core, now manifested as the GeForce 8800. We won't rehash the mountainous DDR3 specs, pipelines, and clock rates here—or the quantum leap in benchmark results they're yielding across the board. Suffice it to say that this world's first DirectX 10 adapter blows past the 512-instruction limit most developers accepted for pixel shading. The 8800 delivers DX10 support of over 64,000 instructions. Some might look at this and think, "OK, it's over 100 times more instructions. So what?" That's exactly what we asked Tony Tamasi, vice president of technical marketing for Nvidia.

BFG Nvidia Geforce 8800 GTX

"Today's games mostly are like crawling through a tunnel," he says. "First-person shooters tend to be indoors, and the walls are pretty flat. There isn't a lot of stuff in their world. With two orders of magnitude more flexibility for programmer expressiveness, you're going to see forests full of trees that have individual leaves on them; blades of grass that are all individually drawn; characters actually interacting with their environments. When a character walks through a shrub, the branches will move and the shadows from individual leaves with be cast onto the character. Today in a FPS, the only things you can shoot are usually the bad guys. Now, you'll be able to interact with the world in a meaningful way. When you throw a grenade in a forest, it's going to blow up trees. There'll be much more interactivity in the world. It won't just be richer, but more alive."

Essentially, Tamasi is describing physics processing of the sort we've already seen from AGEIA. The difference is that now there's no discrete add-in card. The physics engine (powered by Havok's code) is already built into the GPU. Nvidia's drivers dynamically monitor all graphics needs, so if an application needs to rebalance for more physics computation and less geometry, then the processor allocates resources accordingly. When a user needs more overall horsepower, just smack another card into the SLI chain.

At launch, the GeForce 8800 GT ran about $665, but we're confident that Nvidia will follow its historical pattern and deliver more affordable G80 versions in the coming months. Of all the innovations we're anticipating, this one has us the most excited.

But don't think that there isn't plenty of activity under ATI's tent. Although plenty of details about the highly anticipated R600 have already leaked, the company has remained tight-lipped about its upcoming G80 killer. Barring any setbacks, R600 cards should start showing up on store shelves near the end of January 2007 (which just happens to coincide with a fairly significant software launch). Like the G80, ATI's R600 is rumored to significantly depart from previous microarchitectures. We caught up with Chris Evenden, ATI's director of public relations, who offered us his take, wrapped in an typical cloak of PR shadows.

"We've seen G80; we know what's in R600," says Evenden. "We're confident R600 is worth waiting for."

Storage Soars With Seagate

Seagate Momentus 5400

You can't always get what you want. The first thing we asked Seagate was when we were going to have 1TB storage units. Seagate spokesman Mike Hall responded, "We came out with the first 750GB hard drive last year, and no one has yet to match that. Obviously, we have 100% of that market, so there are no huge incentives for us to top that at the moment."

So with terabyte drives just waiting around for someone else to catch up with Seagate's current 750GB capacity, it seems all of the innovation for early 2007 will focus on mobile drives. Seagate's new FDE (Full Disk Encryption) technology embodied in its DriveTrust platform hooks in part to the motherboard's BIOS. This technology then encrypts all data written to the drive in real time, even the boot record and OS files, not just a dedicated "security partition." Because all encryption processing is done on-drive, there's no impact on regular PC resources.

"DriveTrust is a drive-level, self-computing environment," says Seagate product marketing manager Joni Clark. "This is the first time this has ever been done. The drive contains a full-fledged computing system, including a processor, RAM, multitasking operating system, and dedicated storage. With the drive, we're offering a single-user version of our software that will allow you to have an admin password and a user password. So in a household PC, a parent could have an admin password that wouldn't allow everyone in the family to re-encrypt the drive and lose all the data."

The suitability of DriveTrust for notebooks is obvious, but there's no word from Seagate yet on when we can expect FDE to move into desktop drive models. In fact, we're more likely to see Seagate's second mobile drive innovation, hybrid flash technology, hit 3.5-inch drives first. Hybrid drives combine rotating storage media with flash memory in one drive. Essentially, the flash area works like an L3 cache, holding commonly needed data ready for quick access. If you can read or write whatever is needed in flash, then there's no need to spin up the platters and activate the heads. The net result is faster performance, greater drive longevity because there's far less mechanical movement, and considerably lower power consumption. This is partly why a system will require hybrid drives to earn the Vista Premium Logo, although the requirement for this was pushed up from mid-2007 to mid-2008.

Eagerly Waiting

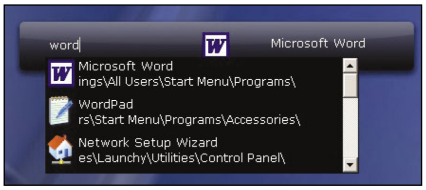
In talking with these vendors, we're reminded that the best advances to anticipate aren't always about speed breakthroughs. You can see 2,000 or so pieces of debris flying through the air, possible now because of the G80 GPU, on a benchmark chart. No PCMark score is going to show that Windows Media Player no longer hiccups while you're ripping into DivX because the system is flying on a quad-core chip. And no one is going to strut through the office with a notebook sporting an FDE drive and say, "Hey, you know what? This baby's *encrypted*." But these are the advances that matter. Speed is great, but new experiences can be even better, and this is what we're really looking forward to in 2007. ▲

by Billy Ristle

The Bleeding Edge Of Software

Inside The World Of Betas

Launchy 1.0 Beta



word
Microsoft Word

Microsoft Word
ings\All Users\Start Menu\Programs\

WordPad
rs\Start Menu\Programs\Accessories\

Network Setup Wizard
es\Launchy\Utilities\Control Panel\

Official product name: Launchy
Version # previewed: 1.0 Beta
Publisher: Josh Karlin
Developer and URL: Josh Karlin; launchy.net
ETA: Q4 2006
Why you should care: There's never been a faster and freer way to launch your Windows apps.

For too long Windows users have had to suffer through troublesome program launchers. The Start menu is fine at first, but as soon as you have 40 or 50 submenus and sub-submenus, finding a program can take forever. You could set Desktop icons for your favorite programs, but after you add more than 20 or so, your on-screen Desktop might look as messy as your real desktop. A third option is Launchy, which may be the fastest way to launch any application or open your files.

Launchy is a program launcher without icons. Once you install the program, all you have to do is press ALT-Spacebar and start typing the name of the program you want to launch, such as **Word** or **Firefox**. After that, press ENTER and the program you want will launch automatically.

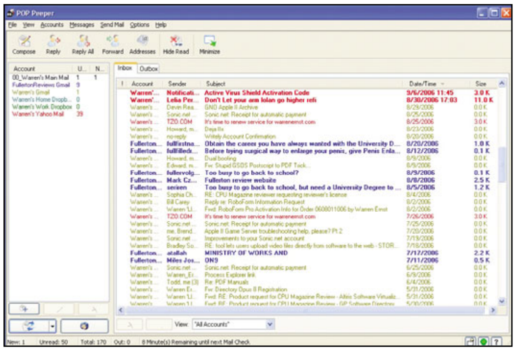
But wait, there's more. If you have several programs that match what you're typing, just pause a moment and let Launchy display a list of programs. For example, if you type **Wor** and then pause, Launchy will pop up a list with Word, Wordpad, and other programs with the letters "wor" in them. If you change your mind, press ALT-Spacebar and Launchy will disappear.

You can also have Launchy keep track of all your DOC files, MP3s, or any type of file in any folder on your computer. The program rescans your folders and shortcuts every 20 minutes by default, but even this is configurable. About 10 skins came with Launchy as of this writing (right-click the launcher to bring up skin choices), but an active Launchy community is creating many downloadable skins as you read this.

After a few hours, Launchy becomes second nature, and you'll soon wonder how you ever used Windows without it. And because it's a free utility, you can install it on every computer you own. ▲

by Warren Ernst

Pop Peeper 3.0 RC4


POP Peeper
File View Accounts Messages Send Mail Options Help
Compose
Reply
Reply All
Forward
Addresses
Hide Read
Minimize
Account
Inbox
Outbox
Sender
Subject
Date/Time
Size
View: "All Accounts"
New: 1 Unread: 50 Total: 170 Out: 0 8 Minute(s) Remaining until next Mail Check

Official product name: Pop Peeper
Version # previewed: 3.0 RC 4
Publisher: Mortal Universe
Developer and URL: Mortal Universe; www.poppeeper.com
ETA: Q4 2006
Why you should care: A great way to keep track of all your email addresses in one place.

Keeping track of multiple email accounts can be tricky. Sure, some e mail notifiers do a pretty good job of dealing with all your email accounts, but they can add unnecessary complications to the accounts you rarely use. Web mail accounts complicate things further because most email notifiers can't directly interact with AOL Mail, Yahoo! Mail, Hotmail, and other Web mail providers. The solution to both these problems, and maybe some more you haven't considered, is Pop Peeper.

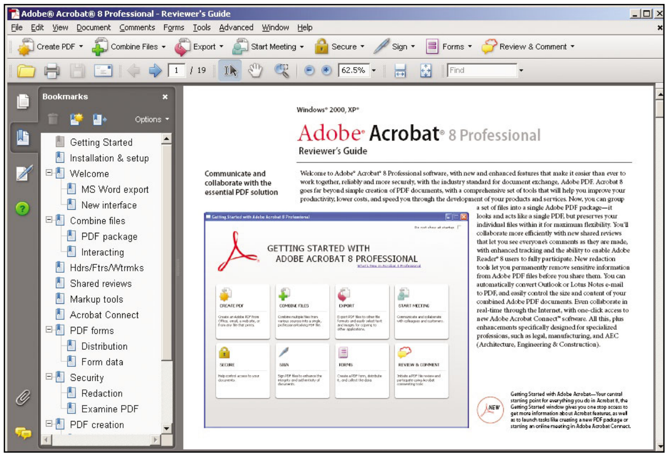
As its name suggests, Josh Karlin designed Pop Peeper to peep at your email accounts and tell you when you get new mail. Unlike other email notifiers, Pop Peeper also knows how to look at different Web mail accounts, including Hotmail, Yahoo!, MyWay, Excite, Gmail, and more. Of course, it can also log into local email accounts via the POP3 protocol, but the beta now speaks IMAP, which lets it get updates the very instant new messages arrive.

Pop Peeper excels if you have multiple email accounts. All you have to do is enter the account information for all your email accounts and then PP can log in every few minutes to display a message count and, optionally, the messages themselves. You can even display the contents of a message, and if you really want to, respond to it right on the spot.

The beauty of Pop Peeper is that it's lean and mean, consuming about 7MB RAM and almost no CPU time even when there's an active Internet connection. Also, an active skin community helps it fit in with any Desktop theme. There isn't a better program at Pop Peeper's price—free—that lets you peak at your numerous email accounts all at once. ▲

by Warren Ernst

Adobe Acrobat 8 Professional Beta



Communicate and collaborate with the essential PDF solution

Welcome to Adobe® Acrobat® 8 Professional software, with new and enhanced features that make it easier than ever to work together, reliably and more securely, with the industry standard for document exchange, Adobe PDF. Acrobat 8 goes far beyond simple creation of PDF documents, with a comprehensive set of tools that will help you improve your productivity, lower costs, and speed you through the development of your products and services. Now, you can group a set of files into a single Adobe PDF package—it looks and acts like a single PDF, but preserves your individual files within it for maximum flexibility. You'll collaborate more efficiently with new shared reviews that let you see everyone's comments as they are made, with enhanced tracking and the ability to enable Adobe Reader® 8 users to fully participate. New redaction tools let you permanently remove sensitive information from Adobe PDF files before you share them. You can automatically convert Outlook or Lotus Notes e-mail to PDF, and easily control the size and content of your combined Adobe PDF documents. Even collaborate in real-time through the Internet, with one-click access to new Adobe Acrobat Connect™ software. All this, plus enhancements specifically designed for specialized professions, such as legal, manufacturing, and AEC (Architecture, Engineering & Construction).

Getting Started with Adobe Acrobat—Your central starting point for everything you do in Acrobat 8, the Getting Started window gives you one stop access to get more information about Acrobat features, as well as to launch tasks like creating a new PDF package or starting an online meeting in Adobe Acrobat Connect.

Official product name: Adobe Acrobat 8 Professional
Version # previewed: 8.0 Beta
Publisher: Adobe
Developer and URL: Adobe; www.adobe.com
ETA: Q4 2006
Why you should care: The ultimate PDF creation tool.

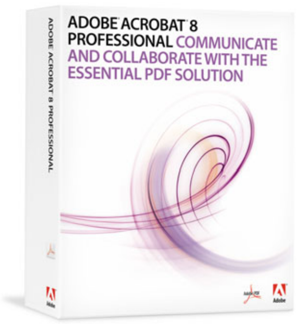
Adobe's Acrobat 8 Professional should be available by the time you read this, but I got my hands on Acrobat 8 Pro Beta to give you a taste of what's to come.

To start off, the full installation of Acrobat 8 Pro consumed an eye-popping 950MB of hard drive space on my PC and installed three startup apps and one service; however, Acrobat 8 started up at least twice as fast as Acrobat 7. That said, opening simple documents required almost twice the RAM (26MB vs. 50MB for a 664KB, 40-page, text-heavy document), but this may be because Acrobat 8 Pro is a beta-test version of the software.

The main window in Acrobat 8 Pro is no longer burdened with cluttered toolbars and odd-looking sideways tabs on the Navigation Pane or split controls (with some controls on the top of the window and others at the bottom). A new Getting Started window does an effective job of guiding you through complex tasks, offering detailed help when necessary but usually offering just enough assistance to complete a simple or complex job. As a result, there's virtually no need to consult the very long and potentially confusing Help system or wander aimlessly through all of Acrobat's menus.

Of course Acrobat 8 Pro can create PDF files from basically any application that can print (via an Acrobat print driver), but that's just the beginning. New to version 8 is the concept of Acrobat "packages," which lets you combine different PDF documents (and even native files such as Excel spreadsheets) into a single, distributable file (think of it like a ZIP file with lots of subfiles within). With previous versions of Acrobat you had to combine several PDF files into one large PDF file, which wasn't suitable for maintaining file integrity for contracts, court cases, and digital signatures. But now with Acrobat 8 Pro you can strip the headers and footers of the source documents and replace them with new ones that remain consistent across the entire package. You can also do this when combing PDFs as before.

PDF files can now do a lot more than just hold text and "flat" graphics. It's easy to add Flash movies or Windows Media Player, QuickTime, or RealPlayer-compatible multimedia directly to a PDF file, and these programs will play for anyone with Acrobat Reader 7 or newer (and with the appropriate player installed). You can also add AutoCAD 3D constructs—even if you don't have AutoCAD software on your PC—and the process is more efficient than Acrobat 7, so the resulting PDF files are more compact.


ADOBE ACROBAT 8 PROFESSIONAL COMMUNICATE AND COLLABORATE WITH THE ESSENTIAL PDF SOLUTION
ADOBE ACROBAT 8 PROFESSIONAL

Because Acrobat 8 Pro is geared toward "workgroups and individuals in enterprises and industries such as AEC (architecture, engineering, and construction)," Adobe has streamlined and improved workgroup and collaboration tools. Reviewers can request comments and markups and Acrobat 8 Pro can send those markups almost immediately via the Internet or LAN. The process is so fast that reviewers can actually see a workgroup adding comments in near real time, allowing for conversations within Acrobat directly. For workgroups, there's also integration with Adobe's "virtual online meeting rooms" product called Acrobat Connect. With Acrobat Connect, you can embed links to your personal meeting space directly into PDF files and conduct your group edits "face-to-face."

Speaking of forms, Acrobat Pro 8 makes creating them trouble-free. Acrobat can convert a "fill in the blank"-type form in Word to a PDF and then automatically read the document and create interactive fields. If you'd rather build forms from scratch, you can either use the built-in Acrobat wizards or the bundled LiveCycle Designer to lay them out interactively. For collecting results, Acrobat 8 Pro can then read the data and create an XML or CSV file, which Excel or other database programs can easily read.

If some of these features seem like overkill for the small business or home user (and I didn't even mention Lotus Notes/Outlook archive-old-emails-to-searchable-PDF, PDF/X and PDF/A creation, and permanent redaction tools), that's because they probably are. Adobe would seem to disagree with you because there's now a whole family of PDF creation products with Acrobat 8 Pro at the top of the heap. For those of us who need all this enterprise-grade functionality, there's never been a better Acrobat. ▲

by Warren Ernst

UP TO SPEED

Upgrades That'll Keep You Humming Along

Some indispensable tools for the PC get upgrades this month, including the much-discussed Internet Explorer 7. The ubiquitous WinZip enjoys some revisions, as does the popular defrag tool Diskeeper. AOL also releases a radical upgrade to its software.

Upgrades

AOL For Windows 9.0 Vista Ready Beta 7

The newly released AOL 9 software gets a refresh to operate under Windows Vista. The latest AOL interface uses telescoping panes to keep email, browsing, and multimedia on the same screen.

Get it at: www.aol.com

BitComet 0.75

This BitTorrent client gets a better user interface and improved HTTP/FTP download functions. Fixes to the GUI resolve some rare problems, and a core bug fix addresses program crashes.

Get it at: www.bitcomet.com

BitTornado 0.3.17

One of the more popular BitTorrent clients for peer-to-peer file downloading is now more stable with this release. Specifically, BitTornado addresses a common crash bug.

Get it at: www.bittornado.com

CCleaner 1.34.407

This freeware system cleaner software now embraces cleaning for Visio 2003, AVG Anti-Spyware, and CuteFTP, as well as updates cleaning for Outlook 2003 and QuickTime. CCleaner also handles Regedit errors better.

Get it at: www.ccleaner.com

Diskeeper 2007

The perennial disk defragmenter says its new InvisiTasking function can defrag in real time in the background to avoid defragmentation from occurring in the first place.

Get it at: www.diskeeper.com

FileZilla 3.0.0 Beta 2

The FTP client fixes a problem with time-outs and the software updater. The upload progress bar now works properly with SFTP transfers.

Get it at: filezilla.sourceforge.net

Foobar2000 0.9.4.1

The audio player now has better compliance with Vorbis Comment and APEv2 tag specs. There's now gapless playback of MP4 files from iTunes.

Get it at: www.foobar2000.com

Fraps 2.8.1

This software gets greater flexibility to record in 1,280 x 1,024 or 1080p with dual-core CPUs and up to 2,560 x 1,600. Various fixes include skewed video capture, show recording, and crashing when Fraps exits, among others.

Get it at: www.fraps.com

Internet Explorer 7

Tabbed browsing, RSS feeds, antiphishing measures, a leaner interface, and more flexible printing are among the major changes in IE7.

Get it at: www.microsoft.com

K-Lite Mega Codec Pack 1.60 Beta2

The latest pack of codecs includes the new version of Media Player Classic, along with updates to the ffdshow, DivX, AC3Filter, x264 VFW, and RealMedia codecs.

Get it at: www.codecguide.com

Magix Webradio Recorder 2

This new version now can tune in to and record music and shows from 3,000 radio stations worldwide. The recorder has audio ID built in to identify songs, a virtual cutting tool to splice recorded streams into individual songs, and audio enhancement for better sound rendering.

Get it at: www.magix.com

Real Alternative Regular 1.51

This add-on lets you run Real format media files without having to install the RealPlayer. This version adds the new Media Player Classic and updates RealMedia components.

Get it at: www.codecguide.com

WinZip 11 Build 7291 Beta

This program can now select "best compression" algorithms automatically, compress WAV music, and extract BZ2 and RAR files. You can also view thumbnails within zipped files.

Get it at: www.winzip.com

Driver Bay

ATI Catalyst 6.10 Drivers For Radeon Xpress X1150/200

These drivers add CrossFire support for the Intel 965 chipset and benchmark and game performance increases.

Get it at: ati.amd.com

nForce 590 SLI Intel Edition 9.53

This WHQL driver package includes the latest version of the Ethernet driver, network management tools, SMBus driver, SATA RAID and IDE drivers, and the RAIDTOOL application.

Get it at: www.nvidia.com

Zen Vision:M PlaysForSure Plug-In 5.00.31

This package for the Creative multimedia player combines the latest versions of Creative's MediaSource, Synch Manager, and Video Converter. This plug-in brings the player up-to-date for using online PlaysForSure media subscription services.

Get it at: www.creative.com

by Steve Smith

"Why is Antec The Power of Me? Simple: Without Antec, I'm Powerless!"

TRUE**POWER** TRIO
430W/550W/650W

"My life is working with computers. I've worked with a lot of them in the last 20 years. The case and power supplies that I purchase are Antec. Why? They simply work, are reliable, and continually exceed my expectations."

David Kennedy
Roswell, GA, USA

Antec®
The Power of You

BEST BUY · COMPUSA WHERE AMERICA BUYS TECHNOLOGY · circuit city · J&R · MICRO CENTER THE COMPUTER DEPARTMENT STORE · STAPLES · fry's ELECTRONICS Outpost.com · amazon.com · buy.com · newegg.com

Protect Yourself From Phishy Web Sites

A Roundup Of Antiphishing Software

Just when you thought you were safe to surf the 'Net with "merely" an antivirus and an antispyware program, a firewall, and a secure Web browser, another online threat arises, along with a matching set of tools to combat it. That threat, called phishing, is now becoming big business, both to the online scammers who are trying to reel you in and to the software writers who want to help you wriggle out of the phisherman's net unscathed.

The sites most phishers typically choose to emulate are PayPal and eBay, but they also imitate virtually every major bank (Citibank, Wells Fargo, Bank of America, etc.) and thousands of smaller banks every day in the hopes that a user will type in his account, credit card, PIN, and/or Social Security numbers. And once he types them in and clicks the login button on a fake site, the phisher can then steal all of his personal information.

Unfortunately, due to the way people create Web sites, duplicating one isn't entirely difficult for phishers. It's fairly simple to copy every GIF and JPG graphics file from a Web site, and clicking View and Source in the menu bar of a Web browser makes copying the HTML files child's play. Slightly more difficult for some phishers is either downloading the site's CSS file or modifying the copied HTML code so that they can duplicate a site's fonts and page layout exactly. Furthermore, phishers need some sort of server-side CGI script (usually written in PHP or Perl) in order to process the data they enter, but lucky for them—and unlucky for us—phishing-scheme source code is widely available and ready to plug in to a new phishing site in minutes. Finally, phishers will have to put all of this information on a Web server. Regrettably, anything from a free hosting site to a hacked Web server, a spyware-infested PC with broadband to a legitimate Web hosting account paid for with a stolen credit card can host a phishing scam. In the end, if done skillfully, a phisher's final fake Web site may look completely identical to the legitimate site and, as a result, rake in vast amounts of personal information in very short order.

Phishing Detection Methods

Unlike virus-laden EXE files or Internet Explorer toolbars with hidden spyware, an individual with some HTML knowledge could reliably distinguish a phishing site from a real banking site by studying a site's HTML coding. All he would need is to view the page's source code (click View and Source in the menu bar as I mentioned previously) and then use some IP address lookup/WhoIs tools. Usually, it's fairly easy to determine that a phishing site's graphics are coming from a different server than where the site locates the HTML or script files and that the main server's IP address isn't under the control of the organization it claims to be. For example, eBay's sign-in page shouldn't be coming from a Russian telecom company's server.

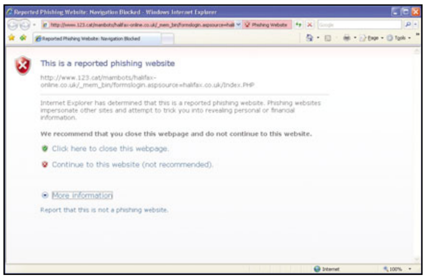
For the most part, automated tools don't generally do as good a job at detecting phishing sites as does a user with the requisite knowledge set, and the amount of time that such a user needs to correctly identify a phishing site is usually quite low. As a result of this, users and companies began creating large databases of known phishing sites and soon after started creating browser toolbars to make the process of flagging a phishing site easier. With thousands of observant users flagging sites around the clock and all over the world, these databases have the potential to grow quite large and identify phishing sites very quickly. Timing is everything in the world of antiphishing sites, which I'll explain more in-depth in the coming paragraphs.

Consulting a regularly updated, user-generated database seems to yield better results than heuristics checking a site "on the spot" (at least for now). This is probably mostly because of the countless ways a phisher could create a phishing Web site to look like a legitimate site. Microsoft, Google, Netcraft, Symantec, and other third parties maintain their own databases of phishing sites, have products and services that add to and check these databases constantly, and form the core of all of the antiphishing products I've reviewed for this roundup.

Complications During Testing

Testing antiphishing software is difficult because the category is so new, there's wide disagreement as to what's the best way to protect users from the hazards of phishing sites, and test results are time-sensitive. Complicating matters, the latest versions of the two major Web browsers, Windows Internet Explorer 7 and Mozilla Firefox 2.0, have antiphishing technologies built-in, but both technologies work differently. In short, there isn't yet a "standard" for antiphishing software to live up to or even a default behavior.

Phishing sites have a surprisingly short lifetime (sometimes only a few hours) until authorities shut them down. As such, for antiphishing software to be at all useful, it must be able to correctly identify phishing sites within just a couple of minutes of their discovery to properly



Reported Phishing Website: Navigation Blocked - Windows Internet Explorer

This is a reported phishing website

http://www.123.cat/mambots/halifax-online.co.uk/_mem_bin/formslogin.aspsource=halifax.co.uk/Index.PHP

Internet Explorer has determined that this is a reported phishing website. Phishing websites impersonate other sites and attempt to trick you into revealing personal or financial information.

We recommend that you close this webpage and do not continue to this website.

Click here to close this webpage.

Continue to this website (not recommended).

More information

Report that this is not a phishing website.

Internet Explorer 7 with Windows Live Toolbar and Phishing Filter add-in
Free
Microsoft
toolbar.live.com; addins.msn.com/phishingfilter
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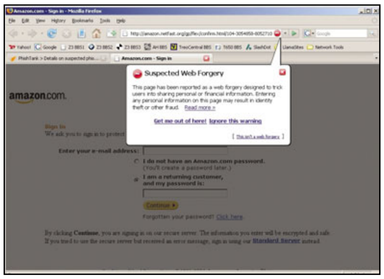

Amazon.com - Sign In - Mozilla Firefox

Suspected Web Forgery

This page has been reported as a web forgery designed to trick users into sharing personal or financial information. Entering any personal information on this page may result in identity theft or other fraud. Read more »

Get me out of here! Ignore this warning

[This isn't a web forgery]

amazon.com
Enter your e-mail address:
I do not have an Amazon.com password.
(You'll create a password later.)
I am a returning customer, and my password is:
Continue
Forgotten your password? Click here.

Firefox 2.0 with Google Toolbar and Safe Browsing
Free
Firefox/Google
www.google.com/tools/firefox/safebrowsing
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warn users in time. It's practically valueless for an antiphishing tool to not block a site until a whole day passes because the majority of them could be gone by then.

I consulted a relatively new open-source antiphishing database called the PhishTank (www.phishtank.com), run by OpenDNS, in which motivated users submit "phishy" emails and Web sites. The site's users inspect and vote on whether posted phishy sites are actually real phishing sites. The PhishTank also lists when the user first submitted the site, when it was verified, and if it is still online or dead. Early on a weekend morning (when I hoped eBay and online banking security officers would be sleeping), I tried accessing 60 "live" phishing sites on Web browsers equipped with different antiphishing tools. During the time it took to compile the list and start testing, 11 of the sites were already offline, and over the course of three hours, six more sites died. Clearly, antiphishing products have to aim at a moving target.

I would have liked a larger sample of phishing sites to test, but I was dealing with two issues: First, I was trying to avoid phishing site lists (usually commercial) I knew one or more of the products I was testing used, which I thought could skew my results. Because the PhishTank is an open-source list, I believed it would be a good resource that would provide equal access to all vendors, leveling the playing field. Second, some of the 60 working sites I tested were several hours old; a time after which the antiphishing software I was testing had better begun blocking the sites, or else the test and software was virtually worthless.

Warning? Block? What's The Difference?

Should a user's antiphishing software totally block the phishing site or should it merely warn him? On the other hand, the warning on some of the products I tested generated was little more than, "Hmm, we're not sure about this site. Be careful;" whereas other products had tiered warnings (such as "extreme warning" and "warning").

In the end, I considered a site "totally blocked" if no element of the phishing Web site appeared in the browser. A "blocked" site was one where elements of the site appeared in the background but a user couldn't interact with the site until he dismissed or cleared an on-screen dialog box or pop-up window. A "warning" represented a toolbar or other mechanism that displayed a message not to interact with a site but the user could see the entire site and interact with it without clicking anything extra. A "miss" meant the software didn't catch a known phishing site or issued a vague warning that was basically meaningless.

Antiphishing software that blocked or totally blocked phishing sites had enough pluses and minuses, so I scored them the same. The browser never gets a chance to render a totally blocked site, so there's no chance the site can install any spyware embedded in the page on a user's PC. That may seem like a good thing, but spyware isn't generally an issue with phishing sites, and if a user wants to see for himself what the site looks like, he'll probably just click the "display this page anyway" button. If you plan on using any of the products in this roundup for a nontechie family member who likes to view *all* Web pages he comes across, you should consider what method might work best for him.

Microsoft Internet Explorer 7 With Windows Live Toolbar & Phishing Filter Add-In

You know phishing is getting to be a serious problem when Microsoft adds antiphishing technologies to its flagship browser, Internet Explorer 7 and then retrofits Internet Explorer 6 with the same technology via its Windows Live Toolbar add-in. Although IE7 and the Windows Live Toolbar (with optional Phishing Filter) are supposed to access the same Microsoft-run database, when I tested them the Windows Live Toolbar always reported that service was down even though IE7 was running just fine. I hope this is a temporary glitch.

Filters in IE7 totally blocked phishing sites in my tests, displaying a well-written page explaining what was going on. I also got a red warning icon and bar right above the offending Web page. To see the blocked page, IE7 provides a link, but with no false positives (where a real site is blocked as a phishing site) in my tests, there was really little need to click it.

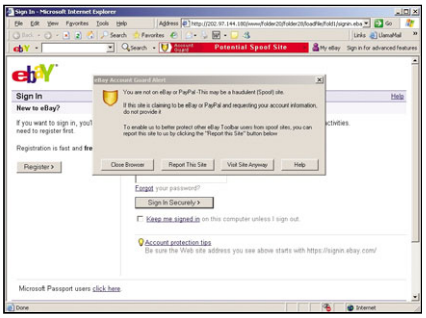
Performance was mixed for Microsoft's Phishing Filter. Although I didn't observe any slowdowns when I enabled it, the filter only blocked about 51% of the phishing sites and warned me of about 5% more.

I consider Microsoft's efforts a good "first step" into the field and applaud it for integrating this technology by default into its Web browser. There is still room for improvement, however.

Firefox 2.0 With Google Toolbar & Safe Browsing

Google obviously has plenty of experience creating databases of categorized Web

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◐ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT



eBay Toolbar with Account Guard
Free
eBay
pages.ebay.com/ebay_toolbar
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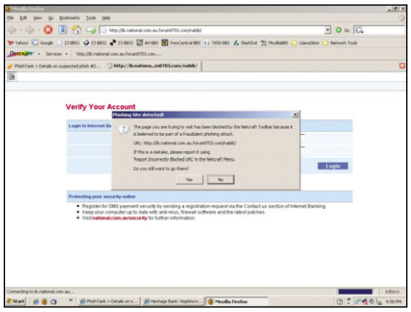

Netcraft Toolbar
Free
Netcraft
toolbar.netcraft.com
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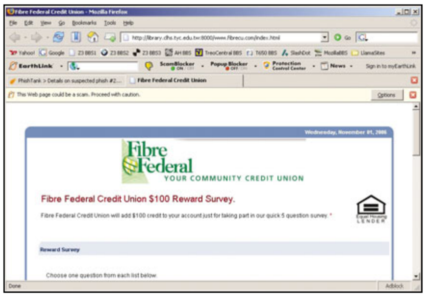


EarthLink Toolbar with ScamBlocker
Free
EarthLink
www.earthlink.net/software/free/toolbar
●●◖

sites. And with the company's affinity for open source in general, and Firefox specifically, it should come as no surprise that Google's Safe Browsing functionality is the engine that drives Firefox 2.0's built-in antiphishing functionality.

Safe Browsing checks sites against Google's phishing site database. There's also an option in Firefox 2.0, however, to simply check sites against an internal database that's updated twice per hour. Using Firefox's internal database to examine Web sites helps prevent Google from keeping a log of every site you visit, but it could also introduce delays in identifying hazardous sites (I found the delay to be negligible) and eat up hard drive space and bandwidth.

The Firefox/Google Toolbar system is very effective, blocking (by my definition) about 85% of the phishing sites I came across with what the Toolbar referred to as a "warning." If you run into a phishing Web site, you'll be able to see the site hiding behind the pop-up Web Forgery dialog box but not interact with it. At this point you can either leave the site by clicking the Get Me Out Of Here! link or clicking the Ignore This Warning link to view the page. It's a solid showing on Google and Mozilla's part.

eBay Toolbar With Account Guard

It seems most phishers tend to copy PayPal and eBay Web sites. So to better defend its users, eBay added Account Guard to its Internet Explorer toolbar. The eBay Toolbar is specialized: It doesn't attempt to check the legitimacy of Web sites that aren't posing as eBay or PayPal—although it actually caught a few anyway.

The eBay Toolbar blocked 90% (18) of the phishing sites that pretended to be eBay or PayPal Web sites but only 43% of all the phishing sites overall in my test sample, which complicates things. If you only use eBay and PayPal, you'll be protected against many phishing sites with the eBay Toolbar. But, to keep your other accounts safe from phishing scams, you'll probably want to run a second program.

Overall the eBay Toolbar displays a green bar when you're at the genuine PayPal and eBay sites, red if you're at a potentially harmful site, and grey if the Toolbar can't identify the Web site. This is worthwhile to some users, but if you're like most, the Toolbar's lack of complete protection is a major drawback.

Netcraft Toolbar

The Netcraft Toolbar is geared toward techies: It's extremely effective, available for both Firefox and Internet Explorer, and lacks the slick marketing look of some of the other utilities, among other things.

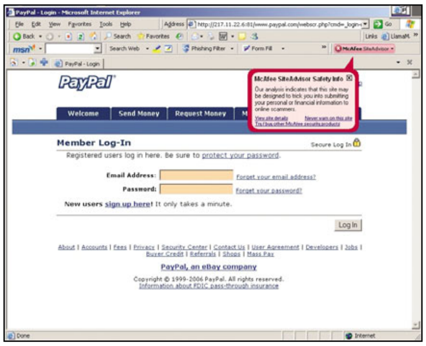
Netcraft can boast about its blocking rate: 95% and no false positives or negatives. When I was browsing a phishing site, a somewhat crude-looking dialog box appeared that warned me that the page I was trying to visit was "part of a fraudulent phishing attack" and then asked if I was sure I wanted to visit the page. (Click Yes to go on to the page or No to exit.) The toolbar also displays other helpful information about the site, such as where the server is physically located and its Risk Rating (determined by Netcraft; on a scale from one to 10). Another cool feature is that the Netcraft Toolbar also attempts to force any new browser windows to display the Address bar and navigational controls, which phishing sites sometimes mask. Additionally, the geographical server location listing should help users flush out super-new phishing sites that aren't yet in the Netcraft database. All of this data may be a bit much for some users, but most power users will probably appreciate it.

EarthLink Toolbar With ScamBlocker

Kudos to EarthLink for attempting to look out for its users with the EarthLink Toolbar featuring ScamBlocker, which is available for both Internet Explorer and Firefox 1.5. Unfortunately, in most cases another utility would probably better serve EarthLink users.

The EarthLink Toolbar is filled with attractive icons and buttons (and even a matching Firefox theme), but when I tested it, its performance was poor on many levels. It only truly blocked one site and issued warnings for just under half my test sites, missing the other half completely. Also, it's too easy to miss

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT



TrustWatch Toolbar
Free
GeoTrust
toolbar.trustwatch.com
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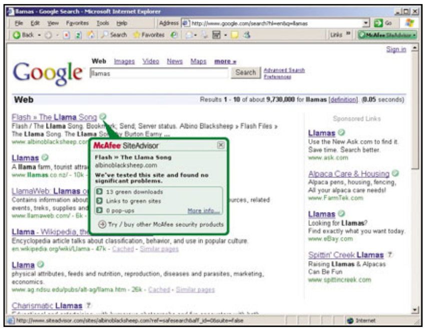
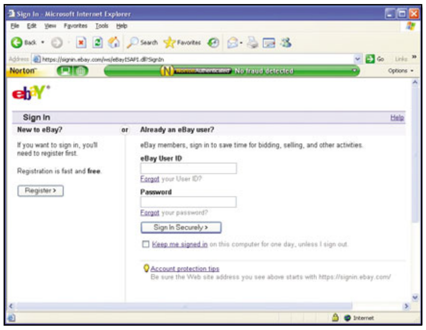


SiteAdvisor
Free
McAfee
www.siteadvisor.com
●



Confidential
$29.99
Symantec
www.symantec.com
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the toolbar's two levels of warnings: The red or yellow "thumbs down" icon on the toolbar blends in too well with the other colorful buttons. Some warnings also generate a yellow band above the Web page (they look similar to the ActiveX warnings Internet Explorer frequently issues), but it is also easy to overlook this band.

To be sure, EarthLink Toolbar's additional features, such as pop-up blocking, RSS reader, and links to other security tools, will interest some users. For the majority of users, however, it would be wise to consider a different antiphishing product.

GeoTrust TrustWatch Toolbar

The TrustWatch toolbar for Internet Explorer is a good idea suffering from poor execution. Though filled with innovative features, it failed to block any of the phishing sites it encountered during my tests and only warned me against 32% of them. If GeoTrust can either get more users to update its database or get access to more data, it may eventually have a winner on its hands.

The TrustWatch toolbar has a large colored block that indicates a potential phishing site's status (green, verified; yellow, not verified; or red, warning), which is hard to miss. During my testing, the toolbar displayed a yellow "not verified" button when it encountered a phishing Web site, which was not helpful for me. I counted this as a miss in my tests.

Other features in this toolbar are more useful; for example, it displays the actual domain name of the site you're really on in an attempt to thwart a site masking a URL in the Address bar. You can also add your own name, security image, or both to the toolbar to thwart masking the toolbar itself. When using popular search engines, the toolbar displays verification icons next to each link to help you avoid phishing sites.

McAfee SiteAdvisor

When discussing the topic of commercial antiphishing products, McAfee's SiteAdvisor routinely comes up. This is apparently a mistake. Although the SiteAdvisor Web site clearly states that it offers protection against "online scams," if you dig deep into the product's support page, you'll eventually find where the developers state: "SiteAdvisor's free software does not currently provide automated or real-time phishing detection."

Still, you won't find the statement, "this product does not protect against phishing scams," on the site, either, which I think will lead many users to inadvertently rely on it to fight phishing, which they shouldn't. McAfee has other products that offer phishing protection, but they include antivirus, antispam, antispyware, and much more. In short, there wasn't any comparable lightweight product as of this writing. (*NOTE: McAfee released SiteAdvisor Plus ($24.99) in November 2006, but I was unable to properly review the product before* CPU *went to print; however, you'll most likely see a review of SiteAdvisor Plus in an upcoming issue of* CPU. *McAfee says SiteAdvisor Plus software doesn't just warn* *users about dangerous sites like the free version of SiteAdvisor does, it "actively shields users' machines from dangerous Web sites."*)

With this in mind, SiteAdvisor's poor showing during my tests was understandable; it didn't block any phishing sites and warned me against just one. Still, the SiteAdvisor has a noticeable and attractive warning indicator and displayed an icon next to search engine results indicating the safety of those sites, which can be helpful.

Available for both Firefox and Internet Explorer, consider SiteAdvisor a useful assistant to whatever antiphishing tool you plan on using.

Phishing Numbers

Here's a breakdown of the numbers we got from our antiphishing products test, broken down by the number of sites blocked, warned, and missed. (We've also included the number of dead sites we came across while testing a certain product and the total number of sites we examined while using the product.)

Product	Blocked	Warned	Missed
Internet Explorer 7 with Windows Live Toolbar and Phishing Filter add-in	21	2	18
Firefox 2.0 with Google Toolbar and Safe Browsing	35	0	6
Firefox 2.0 - Static List	34	0	6
eBay Toolbar with Account Guard	18	0	2
Netcraft Toolbar	40	0	2
EarthLink Toolbar with ScamBlocker	1	20	20
GeoTrust TrustWatch Toolbar	0	14	30
McAfee SiteAdvisor	0	1	43
Norton Confidential	32	9	1

This chart represents the numbers in the chart above in percentages.

Product	% Blocked	% Warned	% Missed
IE7 with Windows Live Toolbar and Phishing Filter add-in	51.2	4.9	43.9
Firefox 2.0 with Google Toolbar and Safe Browsing	85.4	0	14.6
Firefx 2.0 - Static List	85	0	15
eBay Toolbar with Account Guard	90	0	10
Netcraft Toolbar	95.2	0	4.8
EarthLink Toolbar with ScamBlocker	2.4	48.8	48.8
GeoTrust TrustWatch Toolbar	0	31.8	68.2
McAfee SiteAdvisor	0	2.3	97.7
Norton Confidential	76.2	21.4	2.4

Norton Confidential

Norton Confidential is arguably the most thorough antiphishing product in this roundup, offering the most comprehensive set of tools to protect you from online scams. For $29, plus the cost of an annual subscription, it should.

NC relies on both an online database of phishing sites and onboard heuristics—an impressive combination. When I tested the software, NC blocked 76% of phishing sites and gave 21% of the sites a warning in the NC Toolbar. That left only one missed site (2.4%) during my tests, which I considered outstanding. The NC Toolbar only works with Internet Explorer, but Symantec says it's looking into supporting other browsers.

NC offers much more than the competition. It actively searches for keyloggers and other spyware that might be "listening in" to copy your login, passwords, or other sensitive data and either permanently disables them or temporarily jams them. It also offers a password vault and automatic form filler to further thwart keyloggers. And, as an additional safety measure, NC also stamps a few hundred "genuine" Web sites with a Norton Authentication Trust Mark on the toolbar.

All this extra protection sometimes takes a moment longer than the competition on slower computers, but quick PCs shrugged off the extra load.

The Best Way To Catch A Phish

Antiphishing choices largely revolve around your favorite Web browser, but in this case, if you must have a free solution, your browser choice doesn't matter. The Netcraft Toolbar is available for both Firefox and Internet Explorer, offers excellent phishing detection, has many other useful tools, and is the best free option in this roundup. Even though Norton Confidential isn't free and is only available for Internet Explorer (for now), it did catch the most phishing sites in my tests and offers several compelling scam protections that make its price definitely worth considering. ▲

by Warren Ernst

by Blaine A. Flamig

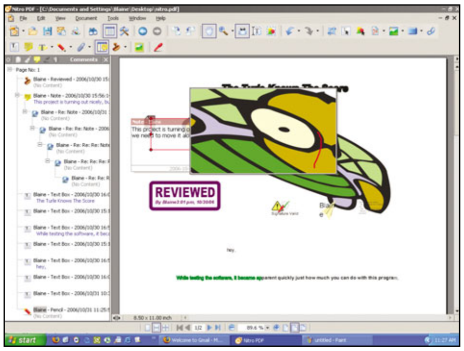
Arts PDF Nitro PDF Professional

As much firepower as Acrobat Pro adds to an arsenal, it takes $449 to score one license. Even the Standard version is $299. Really, though, few people absolutely need even half of Acrobat's considerable weaponry. Still, less-demanding users deserve an alternative packing enough heat to create pro-looking forms, contracts, and more. Such an option is Nitro PDF, whose chief developers worked with Adobe for years writing Acrobat plug-ins.

At $99, NPDF ably covers the basics and more, including converting and sharing PDFs. As Arts PDF puts it, the app is designed to be affordable, accessible, and a source of tools that users really want. Mostly, it is all those things. Among its better aspects is its ability to quickly convert Office files to PDFs via toolbar buttons integrated into Office apps (an included print driver performs the same task). You can also convert PDFs to Word docs in a snap; work with JavaScript; snag clip art or import your own; use stamps and watermarks; and secure docs via AES passwords, user rights, digital signatures, and more.

Particularly impressive are NPDF's collaboration tools. Say you convert a Word doc to PDF (200-plus file formats supported), make your edits, and pass it to co-workers. They can add nondestructive sticky notes, highlights, cross-outs, underlines, signatures, etc., which a sidebar neatly organizes for review. A cool loupe tool that magnifies only a small portion of a PDF is another example of the app's many nice touches. Besides creating numerous PDFs, I opened and edited 15 existing PDFs (contracts, graphics, etc.) in NPDF. You'll appreciate how quickly docs load and the ease of manipulating text and objects—once you grasp the toolbar organization. I saw no system crashes or overly apparent slowdowns in my two weeks of use.

A bundled PDF creator is expected with Vista, and ScanSoft has the similarly priced PDF Converter Pro, but Nitro PDF's trial version is fully functional for 30 days, so there's no reason not to try it. As long as you don't expect the kitchen sink, too, you'll like what you find. ▲



Nitro PDF Professional
$99 ($89.10 current sale price)
Arts PDF
www.nitropdf.com
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PCMesh Anonymous Web Surfing 5.0

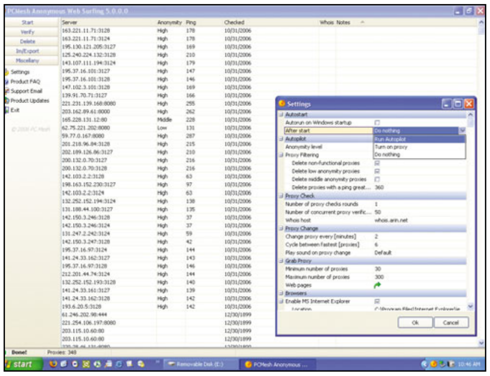
If you really want to surf anonymously, there are better options than Anonymous Web Surfing. Despite a new interface and method of connecting to proxies for better speed, error messages and buggy behavior distracted me from really noticing.

AWS supports Internet Explorer, Mozilla, Netscape, Firefox, and Opera. I tested with Opera 9.2, IE 6 and 7, and Firefox 1.5.0.7 and 2.0. AWS itself is at 5.0, but it often didn't act its age. During one 40-minute stretch, AWS either produced error messages or crashed nine times. Three errors came after pressing CTRL-C to check a proxy IP at WhoIs. Surfing through most proxies that AWS auto-selected for me was also noticeably slower.

When AWS does behave, it makes selecting a proxy automatic. Open the app, click Autopilot, and AWS compiles and verifies a list of proxy servers it then filters according to the anonymity offered. Launch a browser and you're off. You can select proxies manually, plus import/export lists. If you're unsure of the proxies that AWS offers, the only apparent solution is checking each in your browser and deleting the nonfunctional ones. AWS then instructs you to search Google for additional sites that AWS can grab proxies from. If you're thinking you don't need a program to do this, you're probably not alone.

AWS' improved interface is attractive but does not provide much to work from. Start, Verify, Delete, Import/Export, and Miscellany buttons offer starting points, but ascertaining what a given tool does or how to use it is more difficult. There's no discernable Help section, and the only apparent guidance is a sketchy online Product FAQ. You can filter proxies by Anonymity and Ping, but a Checked column, meant to detail when a proxy was last verified, turned up some dates going back to 12/30/1899. Who knew?

After deleting cookies and using my firewalls on and off, IP checks at WhoIs and using utilities at DSLReports.com showed the proxy's IP and not my real IP (although many users report less success with AWS online). AWS offers a few decent tweaks (configure the time between proxy changes, set maximum pings allowed, etc.), but for nearly $40, power users can or probably are already doing much of this themselves free. ▲



Anonymous Web Surfing 5.0
$39.95
PCMesh
www.pcmesh.com
● ●

CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ● ● ◐ 2.5 = ABSOLUTELY AVERAGE | ● ● ● ● ● 5 = ABSOLUTELY PERFECT by Blaine A. Flamig

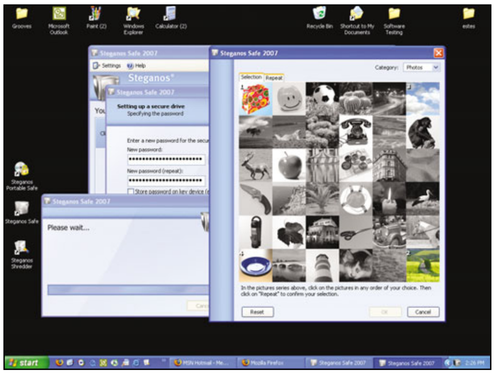
Steganos Safe 2007

Few of us will cop to it, but there's a little snoop in all of us. Unfortunately, snooping works both ways. Leave your PC open to others or forget your notebook or thumb drive in a taxi, and someone will sneak a peek. Steganos Safe 2007 effectively puts the kibosh on those prying eyes.

SS2007 secures data—Outlook email, calendar, contacts, etc.—by creating password-protected virtual drives, or Safes, up to 256GB large (NTFS required). Data is stored as an SLE file and is 256-bit AES-encrypted. When open, Safes appear as removable drives and are accessible as normal. When closed, they disappear from view. Features include Anti Crash Protection, protection against system crashes; changing the size of a Safe at any time; color-coding Safes; and keyboard shortcuts. New is a Portable Safe utility to create Safes on CD/DVDs; key drives; and MP3 players, including iPods. Just connect a key drive with a Safe to another system, enter your password, and you're off without an install needed on the third-party rig.

When creating Safes, SS2007 tells you if your password isn't up to snuff. I purposely created weak, four-letter passwords for Safes on a PC, Creative MP3 player, and two key drives. SS2007 checked my passwords against its integrated, multilingual dictionary, informing me each was unsafe, plus warning me again when I proceeded anyway. SS2007 did deem a 22-character alphanumeric password couldn't be identified "even by using a large number of network computers." SS2007 can also generate passwords, and it uses five padlock icons to depict password quality. My final password received four padlocks. Better is the new PicPass, a cool and effective password alternative that lets you create sequential visual passwords via a configurable 36-image grid.

Other apps offer similar functionality (including the free TrueCrypt), but SS2007's ease of use and performance is especially enticing, even at $49.95. Steganos does throw in a handy Shredder app that destroys data via three options, including the 35-pass Peter Gutmann overwriting process. ▲



Safe 2007
$49.95 ($29.95 upgrade)
Steganos
www.steganos.com
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PictureRetitle 1.0.0.1

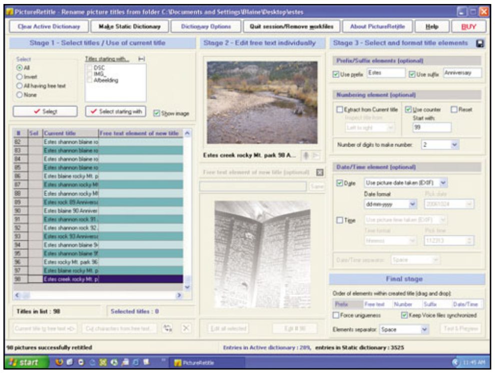
PictureRetitle's name tells you what it does. Initially, though, it isn't any quicker at renaming photos than similar apps or even a right-click and Rename. Given time, though, PR can save you considerable effort, especially with large folders of shots sharing certain traits.

PR's primary feature is its Static and Active dictionaries, which act like the suggested queries that Google's search menu offers as you type in its field. For example, I opened a folder of 98 photos taken in Estes, Colo., in PR, which uses three stages. In Stage 1, you select photos to rename. In Stage 2, you enter Free Text to rename each photo. This is where the dictionaries come in. After typing **Shannon in car** for my first photo, PR stored the entry in the Active Dictionary. Thereafter, typing any related character, such as **S**, displayed a drop-down menu of options, such as Shannon, Shannon in, etc. From there, I could select an entry and edit it appropriately, saving me from repeatedly retyping the same words.

The Active Dictionary stores 500 entries for a current work session, while the Static Dictionary stores up to 100,000 entries entered over time. You can clear an Active Dictionary at any time, configure how many entries are stored and displayed, and use key combinations to edit entries, such as CTRL-L to uncap a word. A Same button conveniently enters the last entry typed, and thumbnail and full screen previews provide visual guides.

In Stage 3, you can universally apply a prefix, suffix, numbering scheme, and date/time (including EXIF data) elements to photo names. There are also buttons to Test & Preview, Keep Voice Files Synchronized, and Force Uniqueness, which adds sequential numbers when necessary to keep photo names unique. Renaming my 98 photos took less than 10 minutes. A different folder of 130 photos went even quicker.

PR's biggest negative is its cluttered interface, which isn't especially intuitive. Additionally, some of the English translations read a bit rough. Positively, PR saves changes automatically when you close it or there's a power failure. Although it lacks some professional polish, PR is good at what it does and is an inexpensive option for quickly renaming dozens of photos in one sitting. ▲



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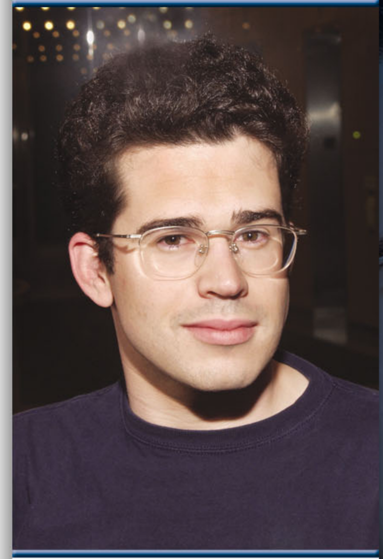
CPU RANKING ○ 0 = ABSOLUTELY WORTHLESS | ●●◖ 2.5 = ABSOLUTELY AVERAGE | ●●●●● 5 = ABSOLUTELY PERFECT

Dialogue Box

Software Will Never Know Everything

by Chris Pirillo



Chris Pirillo runs every Web site on the planet. In 1996, there was only Lockergnome.com—a content network that grows by the day. Technology conference Gnomedex.com launched in 2001 and is now heading into its seventh year. TagJag.com is a link discovery engine, Chris.Pirillo.com is his personal blog, and bLaugh.com is his daily comic that has climbed into Technorati's top 1,000 in a few short months. Keep your eyes trained on the new UndoTV.com, a digital unification of the classic TechTV community that has all but completely disappeared.

I was married last month to Ponzi (on Dec. 9) in Seattle, Wash. Generally speaking, winters are relatively wet up here in the Pacific Northwest. I don't mind the rain a bit, though. We had just closed on a house in the area; the structure was built in 2003, but there were very few cracks in the drywall. And how does this relate to personal technology? Keep reading.

We asked the home inspector (always a wise investment for any home buyer) why this house looked better than other houses we had seen that were roughly the same age. He told us it's not so much the quality of materials in question but the time of year the house was actually constructed. Our house had been assembled during the dryer months, so the wood had retained relatively little moisture and didn't expand as much when the dust had settled. Interesting.

Moments later, we shuffled into the garage, where we were shown the ventilation timer on the furnace. Seems the current owners didn't have it set up at all and were likely not shown how to operate the control when they first moved in. In fact, this operation is so important for efficiency and safety that our home inspector took the time to explain the operation thoroughly.

OK, let's change the scene to something a bit more familiar to all of us.

Your parents walk into a superstore and purchase a "top-of-the-line" computer from some random salesperson. It's a Pentium 4 HT Extreme with 4GB system memory and all the latest software (limited editions and craptacular demos, par for the course). They're happy with their decision, even though they're finding that their "fast computer" doesn't run very fast when they're trying to do many things at once. Why didn't someone tell them that they should have purchased a Core 2 Duo system instead?

They get it home and purchase a subscription for the security software that came preinstalled on their system. Turns out, however, that the security package doesn't include a strong software firewall, and its spyware defense is not as robust as another vendor's. Your parents don't change a single thing in their configuration options, and wind up infected with the latest variant of W32.MoxyFruvous.E@mm.

Geeks have "the computer" figured out, for the most part, but there are certainly times when even the most intelligent keyboard jockey is baffled. In times of despair, we're lucky enough to know where to turn—typically, our circle of friends or the Internet (through Google). We're lucky in the sense that "our world" touches everybody's lives. It's easy enough for us to find answers for nontechnical problems, but how are the nontechnical ever supposed to cope in this overly technical sphere?

Technology will continue to get smarter, but I don't think it'll ever fully replace the humans. Yeah, it's fun to talk about how artificial intelligence makes for more challenging chess matches, but will it ever be able to give us all the information we might need to make more informed decisions for every angle of our lives?

I'd argue that we're all artificially intelligent. We don't know everything and have to do our best with what we have, filling in several knowledge gaps along the way.

Let's say Ponzi and I had a lousy home inspector or were advised not to consult one at all. What if we walked into a money pit of a house because someone didn't tell us that the builders cut corners in all the wrong places? That could have been a very expensive mistake.

Let's say your parents had a lousy sales clerk, were advised not to consult one at all, or went online without third-party guidance to purchase a machine. What if they purchased a computer that did nothing but overheat and drive up their energy bills? On scale, that could have been a very expensive mistake.

But it happens all the time.

Continue to educate yourself, and do your best to educate others. If you give someone tools, make sure he understands how to use them. Software will never be half as intelligent as you. ▲

> Geeks have "the computer" figured out, for the most part, but there are certainly times when even the most intelligent keyboard jockey is baffled.

You can dialogue with Chris at chris@cpumag.com.

Open Sauce

Competing With An 800-Pound Gorilla

by Pete Loshin

Pete Loshin, former technical editor of software reviews for Byte Magazine *(print version), consults and writes about computing and the Internet. He also runs www.linuxcookbook.com. He owns shares of both Microsoft and Red Hat and believes that Windows isn't for everyone, but neither is Linux.*

I'm going way out on a limb regarding Oracle's announcement it was going to start selling third-party support for RHEL (Red Hat Enterprise Linux). I'm not going to say this is only good for Red Hat. It's not, at least in the short term: Red Hat shares dropped like a stone. But in the long run, Oracle's move could turn out to be the best thing to happen to Red Hat, ever.

Why? Because it's the first time in Red Hat's history that it faces a serious, direct competitor.

Samuel Johnson reportedly stated, "Depend upon it, sir, when a man knows he's to be hanged in a fortnight, it concentrates his mind wonderfully." Imagine the concentration in Red Hat corporate offices as Larry Ellison demonstrated how to migrate from a RHEL server to Unbreakable Linux (as Oracle calls its product) in about 90 seconds. Oracle's pricing is significantly lower than Red Hat's (and further discounted until the end of January 2007), and it's offering a free trial to its existing customers.

Red Hat does all the work developing and certifying patches, fixing bugs, providing security updates, and sells support to its customers for a premium. But RHEL is open-source, so it doesn't take a 50,000-plus company (like Oracle) to download the sources and compile its own version without Red Hat's proprietary stuff. That means Oracle can now sell the same thing Red Hat sells—support—without all the costs attendant on developing and maintaining an OS. Oracle is a huge corporation (worth almost $100 billion at the time of this writing) with very deep pockets and capacity to absorb huge losses to enter a lucrative new market.

It's good for Oracle because its database software runs better and faster under Linux than under Windows. It lets Oracle offer complete software from the OS through end-user applications, while also increasing its potential to generate revenue. And if Oracle tweaks Linux a bit to make it an even better platform, then that's another win for the company and its customers.

Red Hat's immediate response was to produce a document titled "Unfakeable Linux," detailing all the good reasons to stick with Red Hat for RHEL support rather than switch to the lower-priced spread. For example, Red Hat points out that Oracle's tweaks to the OS mean it's no longer certifiably RHEL-compatible. Then, there's everything you lose by dropping Red Hat: being first in line for RHEL patches, updates, and fixes; access to Red Hat's developers for resolving tricky support issues; and support for the rest of Red Hat's line, including JBoss, Hibernate, Red Hat GFS, Red Hat Cluster Suite, Red Hat Directory Server, Red Hat Certificate System, and the Red Hat Application Stack.

Then there's fine print with Unbreakable Linux: Oracle "reserves the right to desupport" certain releases, while Red Hat guarantees a seven-year support life cycle for all releases. Red Hat offers more flexibility in choosing service levels for different systems, while Oracle requires all supported systems be supported at the same (high) level.

But the good news for Red Hat is instant credibility. Open-source doubters have been warning for years about the lack of third-party support for Linux. Who supports you when Red Hat can't? Now, if RHEL is good enough for Oracle, the world's second biggest software company, to sell, then customers who previously dismissed Linux as "not yet ready" have to reconsider their positions.

Sure, Oracle may poach some of Red Hat's customers, but you can also expect Oracle to market Unbreakable Linux to existing Oracle customers who use Windows. But keep in mind that many of those customers are big corporations with policies about evaluating vendors Once Oracle convinces a customer to consider Linux, that customer's policies may practically force him to consider Red Hat as an alternate vendor. The phones may start ringing off the walls at Red Hat's sales offices.

Finally, the best news concerns survival. The fittest survive, and that means Red Hat is going to have to start innovating like the dickens if they hope to remain independent. After all, that's what Oracle is doing. ▲

If RHEL is good enough for Oracle, the world's second biggest software company, to sell, then customers who previously dismissed Linux as "not yet ready" have to reconsider their positions.

You can get saucy with Pete at pete@cpumag.com.

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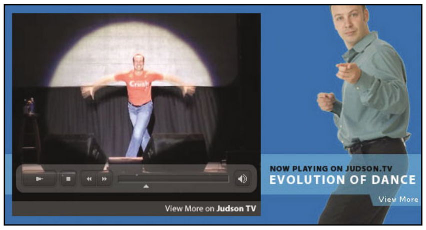
YouTube Celebrity

15 Minutes & Counting . . .

About a month after posting a homemade video to YouTube in April 2006, motivational speaker Judson Laipply received a handful of complimentary emails from viewers who discovered his novel clip on the video-sharing service. He was pleased but thought nothing of it. It was a crude, fuzzy clip of an "Evolution of Dance" routine he added to the inspirational speeches he gives to groups around the country. In it, he does a comic review of the past 50 years of popular dances. YouTube was a new way to connect with his target young audiences, so he posted the clip with little feedback for a few weeks. "Then I left for a weekend camping trip and [when I got back] I had received 700 emails and close to 200,000 viewings." The "Evolution of Dance" video has been viewed more than 35 million times and within months of its posting Laipply was doing his geeky routine on national TV.

Laipply's "Evolution of Dance" was on its way to becoming one of the first viral blockbusters of the new Internet film clip craze. Fueled primarily by the user-generated video-sharing site YouTube, scores of kids in dorm rooms and otherwise unknown amateur filmmakers have found a special kind of celebrity online this year. Take, for instance, the two Israeli women dubbed "tasha" who made their own music video to a Pixies song, which is now one of YouTube's top all-time videos with more than 10 million views. And then there are the "Back Dorm Boys," two Chinese students who lip-synch old Backstreet Boys songs with stunning precision and wit. The wildly successful video series is done on a low-res Web cam with the boys' roommate playing Counter-Strike on another PC in the background. According to reports, Motorola has signed the pair as official spokespersons for its cell phones. No word on whether the anonymous roomie nabbed a game company endorsement.

The engine driving this new route to fame is the incredible phenomenon of YouTube joined with a new generation of cheap, ubiquitous digital video hardware. Other sites have tried to encourage users to upload and share all their videos, but YouTube made the format easier and more socially interesting than its predecessors. Users can upload just about any clip with little to no technical knowledge, and the site uses profiles and social networking to distribute the media virally. A video like Laipply's could languish undiscovered on the system for weeks, but once it started getting a following, the viral effect produced exponential popularity with staggering speed. And one of the reasons these amateur lip-synchers and backyard comedians are finding fame is because YouTube itself is an unprecedented online virus.



Perhaps the most successful YouTube celebrity of them all, Judson Laipply, has leveraged his dance routine into the LiveLoud.tv network of inspirational user-generated videos.

In The Beginning . . .

In August 2005 YouTube had only 58,000 visitors, but by the beginning of 2006 the site had 2.7 million visitors, according to comScore Media Metrix. Between April 2006 and May 2006 monthly visitors shot up from 6.5 million to 12.6 million. According to HitWise, YouTube was the 26th most popular destination on the Web in September 2006. This rise to online power was unprecedented, in that it began only 10 months earlier when someone posted a "Saturday Night Live" skit, "Lazy Sunday," to the Web site, which was then redistributed widely. The rap parody helped millions of people discover the site, spiking traffic 83% in a single week. The virus was released.

And that popularity, that engine of everyman fame, is only going to get more powerful now that Google purchased the site for $1.6 billion in October 2006. In classic YouTube fashion, its founders Steve Chen and Chad Hurley grabbed 15 minutes of viral video glory by announcing the deal in their own homemade clip they posted on YouTube.

Me TV

"To me this is revolutionary," says 18-year-old YouTube star Max Sitnikov. "I see this thing as my own channel." Sitnikov and fellow Pratt Institute student Bryant Fisher got their 15 minutes by tweaking the noses of the traditional TV media. Claiming copyright infringement, NBC forced YouTube to remove the "SNL" "Lazy Sunday" clip from its service in late 2005. "We noticed that the original video was disappearing, and we realized that if we did one ourselves they could not take it down," says Sitnikov. Lifting the soundtrack from the SNL rap and using their

Geoffrey James: The Borg Warrior Gets YouTubed

Not all user-generated YouTube video involves lip-synching in a dorm room. Machinima-maker and tech author Geoffrey James brought a cult following to YouTube in late 2006 with his novel “Borg War” machinima series. A “Star Trek” adventure that used an existing game engine and audio clips of actor Patrick Stewart, the series was among the most popular at Machinima.com. James started posting clips on YouTube and quickly discovered a powerful distribution vehicle for one-man video makers.

CPU: Who is behind “Borg War”?

James: “Borg War” is a single-person production, although I did draw on my friends for advice and encouragement. I have proven that a single individual working alone can now create an entire feature-length movie matching the quality of fully animated films of 15 years ago.

CPU: By posting previews and clips to YouTube, how much has this viral vehicle improved on distributing the film only through machinima circles?

James: For the time being, I am using YouTube and other mainstream video distribution sites as advertising rather than as distribution channels. However, these ads have proven very popular, generating almost as much traffic as the actual episodes on Machinima.com. The potential impact is incredible. I am planning a more general release on the mainstream sites. I fully expect “Borg War” to move into the million-view category within a few months.

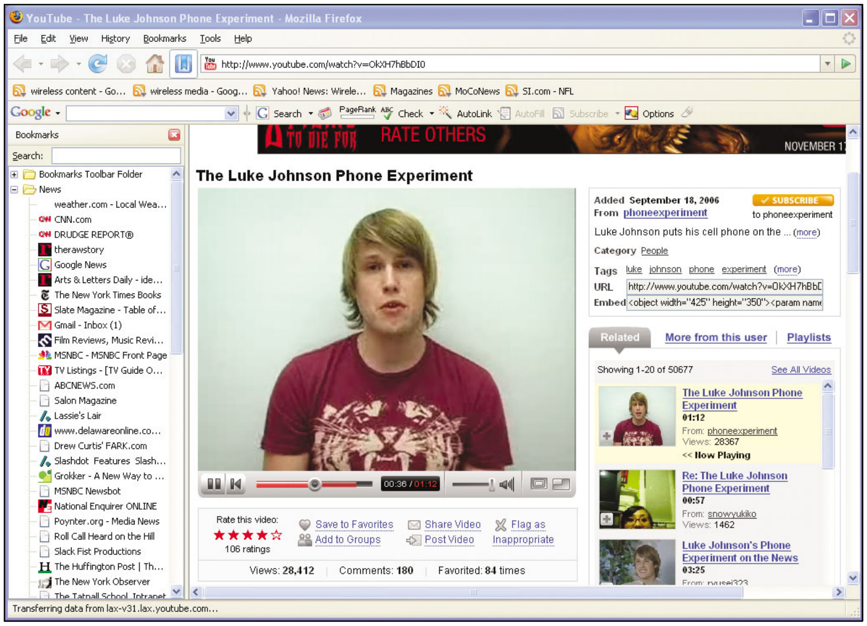
CPU: Does YouTube represent a kind of democratization of media, where both lip-synchers in dorm rooms and indie innovators can float to the top of the media pile?

James: In order for the democratization to truly take place, private individuals must be able to create their own high-quality content that can compete with that coming from major media firms.

CPU: As you look to using platforms such as YouTube to distribute your films, do you have a plan in mind?

James: The movie appears to have a life of its own. I just drop it into the system. The videos appear to gain a following on their own. ▲

own skills as student filmmakers, Fisher and Sitnikov produced a frame-by-frame remake of the “Lazy Sunday” video with themselves as stars. They even used some of the same streets and backdrops in New York City in the original. Many others lip-synched the SNL clip, but Sitnikov and Fisher’s was such a well-done, spot-on remake that it garnered over 86,000 viewings in 2006.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Rate this video:
106 ratings
Save to Favorites
Share Video
Flag as Inappropriate
Add to Groups
Post Video
Views: 28,412
Comments: 180
Favorited: 84 times
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“The Luke Johnson Experiment” asks viewers to call Luke on his cell phone.

How does one get a YouTube hit? Sitnikov believes that despite the site’s reputation for low-res lip synchs, viewers really appreciate quality. “To get a good response you have to make it reasonably well. Content is important,” he says, “but without production quality the content will not be clear and destroy it.”

Grassroots Creativity

The search for YouTube fame already has gone to fascinating but weird lengths. In mid-September last year, 26-year-old Luke Johnson initiated the “Luke Johnson Phone Experiment,” in which he distributed a YouTube video that publicized his cell phone number and asked everyone to call him. According to his PR agent, Johnson received over 8,000 calls from all over the globe after three weeks. There have also been hoaxes, including the now-infamous “lonelygirl15.” When a girl named “Bree” started posting a videos about her lonely and alienated life, it enjoyed a cult following and eventually questions about its veracity. It turns out that “lonelygirl15” really was an actress

YouTube Search Terms

According to HitWise, these were the top search terms that sent people to YouTube in late September and early October 2006.

1. White And Nerdy
2. TMX Elmo
3. Evolution Of Dance
4. Steve Irwin Death Video
5. Star Wars Gay
6. Chicken Noodle Soup
7. Line Rider
8. Pokémon
9. Rebelde Way
10. Giantess/Car Crushing

playing a part in a fiction experiment by two filmmakers.

Not only are YouTube videos viral, but so are the creative concepts. Copycat videos are the real name of the game here. After SNL's "Lazy Sunday" appeared in December 2005, Sitnikov and Fisher's video was but the best of a series of user-generated remakes and parodies. YouTube hits often inspire tons of mimicry; for example, there are now dozens of renditions of Laipply's "Evolution of Dance."

Cash In Quickly

Given its meteoric rise to prominence, YouTube's future remains murky to some in the mainstream media. Many questioned the high price Google paid for the service, wondering whether virally fueled, user-generated video was a new Web fixture or just a fad. Many of the YouTube celebrities are finding ways to leverage their fame. Luke Barats, age 22, and Joe Bereta, 23, recently drew a six-figure contract from NBC to produce comedy skits after their channel on YouTube attracted 700,000 views. Some indie filmmakers are hoping to use YouTube as a better way to distribute their films. Machinima-maker Geoffrey James (see "Q&A Geoffrey James: The Borg Warrior Gets YouTubed") is planting promotions for his "Borg War" animated series across a range of video-sharing sites that now power the user-generated video craze.

For Fisher and Sitnikov, YouTube means media attention. The *Los Angeles Times* featured the duo and named theirs among the top five amateur videos online. "It's been huge for us," says Sitnikov. "We never had 85,000 people watching our work. We've been getting calls from TV channels. They like the idea of covering young directors." The pair has issued several follow-ups to "Lazy Sunday," but none has caught fire like the first video. Sitnikov would love to use their YouTube channel to issue weekly episodes, but for two budding Spielbergs, classes get in the way.

But the poster child for YouTube fame remains Laipply, who landed appearances on "The Ellen Degeneres Show," the Creative Arts Emmy Awards, and the "Today Show." Staying true to his original vision of being an inspirational speaker, Laipply has started LiveLoud.tv, a combination of his own Judson.tv channel and user-generated videos that tell inspiring stories. And, in case anyone was wondering, Laipply does have a sequel to his own blockbuster. We spoke with him in late 2006, a day before he was scheduled to film the second "evolution." "I got so many emails asking why I didn't include certain songs, so I compiled a list and edited the songs together," he said. Laipply, who describes his routine as a funny dance done by "some idiotic white guy," is determined to combine entertainment with inspiration.

One good thing about YouTube fame is that it often comes without the downside of lost privacy, says Laipply. His video is so fuzzy that no one can see his face very clearly. "I don't have to deal with people coming up to me and saying, 'hey, will you dance for me?' " ▲

by Steve Smith

Max Sitnikov and Bryant Fisher rose to YouTube stardom by forming a frame-by-frame remake of "Saturday Night Live's" "Lazy Sunday" skit, including some of the same backdrops in New York City.

Two Chinese students, dubbed the "Back Dorm Boys," produced perfectly syncopated and choreographed lip-synchs to Backstreet Boys tunes while their roommate plays Counter-Strike in the background.

Infinite Loop

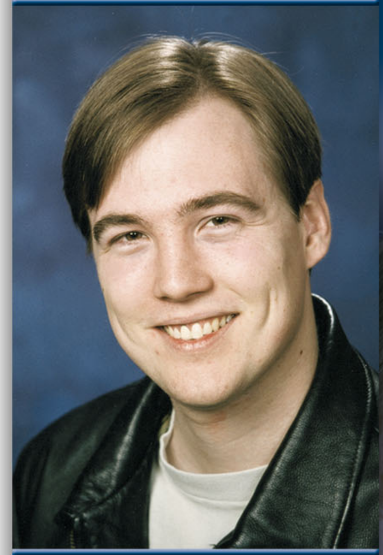
The New Dew

The new "Tuned Up Taste" of Diet Mountain Dew is leaving a bad taste in the mouths of some devoted drinkers. Bo Williams, Webmaster at NewDietDewIsYucky.com, is trying to get PepsiCo to change the formula back. Will Pepsi wise up, or is this Diet Dew fanatic fighting a losing battle? ▲

Source: newdietdewisyucky.com

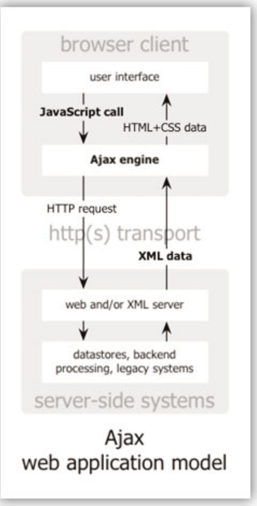
ajaxcrzy.txt

by Rob "CmdrTaco" Malda



Rob "CmdrTaco" Malda is the creator and director of the popular News for Nerds Web site Slashdot.org. He spends his time fiddling with electronic gizmos, wandering the 'Net, watching anime, and trying to think of clever lies to put in his bio so that he seems cooler than he actually is.

We've all gone Ajax crazy. In the past couple of years, the entire industry has begun a shift from good, old-fashioned desktop applications to Web applications—that Web 2.0 buzzword—where your browser acts as a less feature-filled version of a program you already use on a regular basis. On the upside, your documents now travel with you in a trivial manner: You don't have to sync up to a corporate network to get that file you need. That forgotten password that prevents you from penetrating a firewall while borrowing a friend's machine isn't a problem any more. But it's not all roses.



Most substantial is the fact that these applications are almost without fail less fully featured than their big brothers. For simpler applications such as email, this is not such a huge problem, but when you look at Google Spreadsheets, you should wonder. Don't get me wrong, Google Spreadsheets is a pretty amazing piece of code, simulating the vast majority of a modern spreadsheet application. But, the real power of these apps is the macro languages that make complex computation simple. And good luck with that.

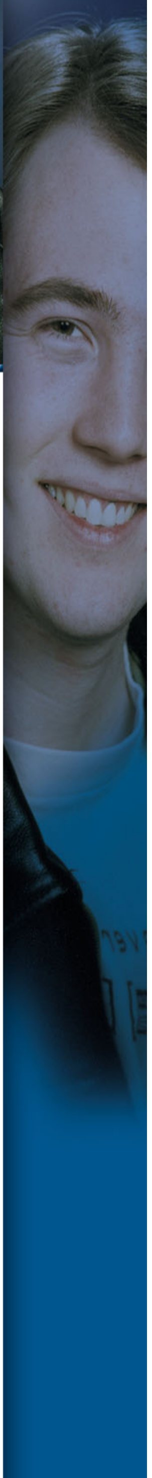
So you sacrifice key functionality to use this new breed of app. Perhaps those functions will return over time, but in many cases, maybe this is a chance to just purge the zillions of mediocre features that exist only to add a new bullet point to the back of a cardboard box that sits on a shelf at CompUSA. In exchange, you get strange new collaborative features. You can easily add collaborators to your documents and edit them together, tracking changes and reverting back if someone screws up. We have all seen what wikis can do with hundreds of contributors, but you'd be surprised how nice it is to simply bash out some specs with co-workers editing a shared document.

Unfortunately, the modern Web browser simply isn't up for the task of replacing your desktop operating system. For all the kludges in the user interface on your desktop, using your local file system is fast and easy. Searching for a file is simple. Maintaining a number of Web-based documents starts becoming a mess as you use the only thing really equipped to handle this problem: your Web browser's bookmarks. And once you start having a couple dozen bookmarks to keep tabs on, you'll really start to notice the mess.

Similarly, most modern Web browsers are based on the dated MDI metaphor popularized by GUIs in the 1990s—that is one window with multiple tabs. This metaphor works OK when you have five Microsoft Word documents encapsulated into Word, but Firefox, in this brave new Ajax world, might contain a dozen documents with everything from your email to your chat client to a random news site and a few spreadsheets. Comfortable desktop concepts such as ALT-TABbing between applications break down. The OS X Dock contains just one Firefox icon, which doesn't give you a clue that it might contain everything you need on your computer—except that it is all buried deep within your bookmark hierarchy.

But this *is* all happening. It seems very likely to me that this new breed of Web apps will replace the low-end of most common desktop applications. We may not see the same level of functionality that we are used to in today's bloated desktop applications, but maybe that is not all bad. It took us decades of trial and error to get the desktop metaphor's kinks worked out, so how long will it take us to translate these new Web metaphors into a desktop that is just as usable? Someday we may see a new generation of DAV-based file systems and Web browsers aware that they are actually mini virtual machines running multiple applications. Until then, however, be prepared for some frustration. ▲

The modern Web browser simply isn't up for the task of replacing your desktop operating system.



Contact me at malda@cpumag.com.

ROAD Warrior

by Jen Edwards

Belkin Releases Wireless USB Hub, Outfits Your Zune

Belkin has introduced its Cable-Free USB Hub, which utilizes cutting-edge UWB (ultra-wideband) technology to free users from the typical clutter of USB cables. The product features four USB ports and works in conjunction with a small USB receiver that plugs into your desktop or laptop computer. The wireless hub has a 30-foot range in which it exchanges data with printers, scanners, and other devices at a speed of up to 480Mbps. The Cable-Free USB Hub ($199.99) is the first UWB product available to the U.S. market.

Belkin also launched a lineup of accessories for Microsoft's Zune media player, including the Acrylic, Folio Kickstand, and Holster cases ($29.99 each). The TunePower ($59.99) extends your Zune's battery life by four to six hours and includes a pop-out kickstand to hold the player at the perfect viewing angle. Finally, the TuneBase FM Transmitter ($79.99) for Zune wirelessly transmits music to your car stereo and also offers a line-out connector. The unit has three radio preset buttons, a backlit display, and flexible steel neck.

Belkin has also received six CES Innovation Distinction awards for its other computing products, which include the new Compact Surge Protector ($34.99), USB 7 Port Plus Hub ($49.99), N1 Wireless Router ($149.99), and TuneBase and TuneTalk Stereo iPod accessories ($79.99 and $69.99, respectively). ▲

Belkin's Folio Kickstand Case protects your Zune and has a handy stand for your on-the-go viewing pleasure.

New Keyboard Makes Mobile Computing Easier

Think Outside (www.thinkoutside.com) has introduced the new Stowaway Sierra Bluetooth Keyboard. The compact, folding keyboard features an improved design with a dedicated row of number keys and 19mm-spaced keys, which is comparable to those found on standard keyboards. The keyboard folds into a package that is only 3.5 x 5 x 0.9 inches (HxWxD) and includes a removable stand to hold a PDA or smartphone. The Think Outside Stowaway Sierra Bluetooth Keyboard is compatible with a wide variety of mobile devices, including Palm OS, Windows Mobile, Windows Mobile Smartphone, Symbian, and OQO. It is available for $129.99 for direct purchase from Think Outside. ▲

Google Launches Mobile Mail For Phones

Google has launched Gmail for mobile devices, which lets users quickly access their Gmail accounts using the same interface available in Desktop Web browsers. Certina email attachments, such as Word documents, photos, and PDF files are viewable within the mobile client. There are no synchronization issues either, because the mobile phone doesn't actually download the messages.

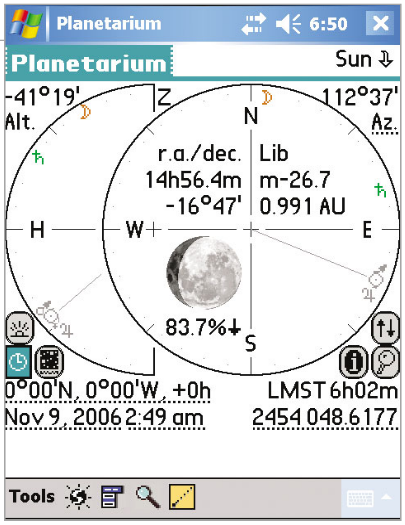
In order to use Gmail for mobile devices, users must point their phone's browser to gmail.com/app. Depending on the specific features of the phone, Gmail will either download a free Java client to the phone or give the user the option to use a Web-based version of the client instead. The application is free, but mobile carriers may apply data charges. ▲

Iambic Software Offers New & Updated Handheld Applications

Iambic Software (www.iambic.com), maker of the Agendus PIM application for Palm OS devices, has recently announced several new applications for Windows Mobile. GoogHelper ($4.95) is a small application that helps users quickly launch searches on their mobile device using a variety of Web sites, including a handful of Google's services (Web, Maps, Groups, etc.), Yahoo! Finance, Amazon, Wikipedia, and others. Instead of tapping several times to open a Web browser, users type the relevant term in the search box and then press an on-screen button to launch the search of their choice.

EZQuote ($9.95) is a stock-tracking application that allows users to monitor their personal financial portfolios. Once the user enters his stock symbols, EZQuote automatically updates the selected stocks and indexes when an Internet connection is available.

The company also recently released updated versions of several of its Palm OS applications, including Agendus for Palm OS, Agendus for Windows (both Palm Desktop and Microsoft Outlook versions), and Agendus Mail for Palm OS. Free trial downloads are available on Iambic's Web site. ▲



With StyleTap 1.0, you can run a vast library of Palm OS applications on your Windows Mobile handheld.

StyleTap Brings Palm OS Applications To Windows Mobile Devices

Software written for one particular OS generally is not compatible with other platforms, but the developers of StyleTap Software (www.styletap.com) have figured out how to make Palm OS applications work on Windows Mobile devices. Palm OS users who have switched to Windows Mobile handhelds are now able to use most of the thousands of applications available for the Palm OS platform, including software programs written for Palm OS 5.0 that require the use of ARMlets.

StyleTap Platform 1.0 for Windows Mobile ($49.95) is compatible with virtually every Windows Mobile device (including the Treo 700), and applications that require Wi-Fi, IR, or Bluetooth connectivity work seamlessly on devices equipped with matching capabilities. StyleTap is also planning a corporate version, which will add support for barcode and RFID scanners. Future product offerings from the company are expected to bring the same platform-agnostic performance to Symbian and Windows Mobile for Smartphones. A 14-day trial download is available on StyleTap's Web site. ▲

Fujitsu Unveils New, Enhanced Convertible Notebook Computers

The LifeBook P1610 ($1,599) convertible notebook weighs only 2.2 pounds and features an 8.9-inch, touchscreen, indoor/outdoor display. During outdoor use, a reflective coating brightens the screen with sunlight, letting users turn off the backlight to extend battery life. The P1610 has an Intel Core Solo U1400 ultra-low-voltage processor, up to 1GB RAM, and up to an 80GB hard drive. Users can choose between Windows XP Professional and WinXP Tablet PC Edition 2005.

The T4215 Tablet PC ($1,799) is a full-sized convertible notebook with a Core 2 Duo processor and a choice of three 12.1-inch displays. It also features a unique bi-directional hinge that lets the screen turn in either direction. A modular bay gives users the option to replace the optical drive with a second battery for extended mobile use.

Both the P1610 and the T4215 offer options such as fingerprint sensors for enhanced security, Bluetooth, and 802.11a/b/g connectivity. ▲

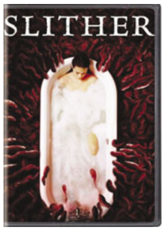
Fujitsu's new convertible notebooks sport a slick indoor/outdoor display and bi-directional hinge that will surely make Tablet PC lovers swoon.

At Your Leisure

The entertainment world, at least where it pertains to technology, morphs, twists, turns, and fires so fast it's hard to keep up. But that's exactly why we love it. For the lowdown on the latest and most interesting releases in PC entertainment, consoles, DVDs, CDs, and just leisure and lifestyle stuff we (for the most part) love and recommend, read on.

Audio Video Corner

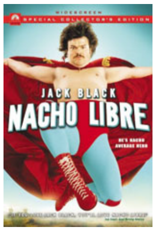
DVDs by Chris Trumble, CDs by Blaine A. Flamig



Slither

In "Slither," director James Gunn trots out every zombie and body snatcher movie cliché known to man, beginning with the shot of an alien hunk of rock plummeting to earth and ending exactly the way you think it will. But thanks to Gunn's entertaining dialogue and some inventive casting, "Slither" is a great deal more fun than we expected. Nathan Fillion ("Firefly," "Serenity") seems right at home in the leading role as chief of police Bill Pardy, and Elizabeth Banks ("Spider-Man," "40 Year Old Virgin") keeps up with him every step of the way. No, this isn't great cinema, but if you're a fan of either the zombie or body snatcher genre, don't pass this one up.

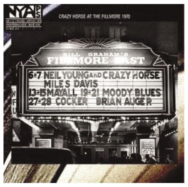
$19.98
Universal Home Video
www.slithermovie.net



Nacho Libre

Jack Black has been very busy the last few years, and with good reason: he has an uncanny knack for taking almost any role and making it memorably funny, a la Will Ferrell. For "Nacho Libre," Black teams up with writer-director Jared Hess of "Napoleon Dynamite" fame, and although the result isn't quite as side-achingly funny as "Dynamite," Black is very good, as is Héctor Jiménez as his luchador sidekick, Esqueleto. In case you haven't seen the trailers (or, for that matter, the movie), Nacho is an orphanage cook who dreams of becoming a famous wrestler so he can afford better food for the kids and maybe win the love of a girl along the way. Humor and stretchy pants ensue.

$29.99
Paramount Home Entertainment
www.nacholibre.com



Neil Young—"Live At The Fillmore East"

In 1970, Neil Young and Crazy Horse played one of those now-historic shows that grew in stature through the years, but one that few fans other than bootleggers have actually heard until now. Featuring the late Danny Whitten, Crazy Horse's original and exceptional rhythm guitarist, Young and the Horse were still youngsters in 1970, yet they soar here through "Down by the River," "Cowgirl in the Sand," "Winterlong," and other now-classics in ragged, disjointed, Crazy Horse wonder. This release doesn't contain Young's complete set that night, but the quality is fantastic, and for Horse fans familiar with Whitten's all-too-short history but deep influence on Young, "Fillmore East" is a real treat.

$18
Reprise
www.neilyoung.com

Tenacious D—"The Pick Of Destiny"

If you're like us, you go back with The D to their days on HBO in the 1990s. This soundtrack to the current movie that Jack Black and Kyle Gass built is what you'd expect from "the greatest band in the world"—equal parts absurdist, rock-n-roll lyrics and Black's trademark over-the-top, Queen-like delivery. Titles such as "The Government Totally Sucks" and "Dude (I Totally Miss You)"indicate what's to come. Both Black and (especially) Gass can handle an axe, but appearances from Dave Grohl, The Dust Brothers, and one Ronnie James Dio take The D up another notch.

$18
Sony Records
www.tenaciousd.com

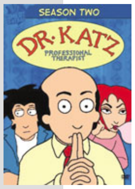
See the full reviews from A/V Corner at www.cpumag.com/cpujan07/AYL

DVD Byte

November 21

Ice Age: The Meltdown

Star Trek The Animated Series



Dr. Katz, Professional Therapist: Season Two

November 28

Clerks II

The Ant Bully

The Christopher Reeve Superman Collection

December 5

24: Season Five

Miami Vice

SNL: The Complete First Season, 1975-1976

December 12

Talladega Nights: The Ballad of Ricky Bobby

World Trade Center

James Bond: Ultimate Collection Volumes 3 & 4

GEARS OF WAR®

See Also: "Killer App" -by Chris Trumble

$59.99 (X360) • ESRB: (M)ature • Microsoft Game Studios • www.gearsofwar.com

We've had an awful lot of fun with the Xbox 360 during its rookie year, but the feeling that we were still waiting for one game to come along and define the Xbox 360 experience never quite went away. Until now.

Put simply, Gears of War is the total package: astonishing visuals, triumphant audio, tight control, an engaging story, and multiplayer options that rival even—dare we say it—Halo 2's. We won't go as far as to say the game has no flaws; we noticed occasional, very slight hitches in the frame rate as we moved between areas and one or two other minor graphical imperfections. But these issues don't even come close to detracting from the fun you'll have playing this game.

In Campaign mode you play as Marcus Fenix, a crusty veteran soldier and former war hero who gets broken out of prison because things outside are really desperate. Humankind is being pummeled by wave after wave of horrific creatures (collectively called the Locust) that come from below ground, and disgraced or not, Fenix knows his way around a battlefield. You'll learn more about the Locust and why Fenix was in prison in the first place as the game progresses, and the story is a nice complement to the intense action.

Said action unfolds primarily in a third-person view that's fairly unique among shooters these days but that is essential to one of Gears' primary features: its cover mechanics. Unlike most shooters where taking cover means ducking back around a corner so you can reload, in Gears of War if you don't use cover effectively throughout each firefight, you're gonna die early and often. The good news is the team at Epic built in some pretty nifty cover controls; just approach a doorway, a concrete barrier, a burned-out car, or other form of shelter and press A. Once you're in place, you can use your left analog stick and your A button to move from cover to cover or use your left trigger to lean out and aim.

Gears gives you a mostly standard complement of weapons with which to battle the Locust hordes, with a couple of key exceptions. The Lancer, or assault rifle, comes equipped with a chainsaw bayonet that makes for some highly cathartic melee attacks, and the Hammer of Dawn is not a gun at all but rather a laser targeting system for military satellites in orbit over Sera, the world that Gears takes place in. You can only use the Hammer of Dawn in specific instances, but calling down a pillar of fire from space on your Locust foes is a treat not to be missed.

There's a lot more to say about Gears of War, but the important thing to take away is this: It's the best game you can currently get for the Xbox 360, and not just by a little. Sound like hyperbole? It's not, but don't take our word for it. ▲

2142
BATTLEFIELD

Clash Of The Titans

-by Dr. Malaprop

$49.95 (PC-DVD) • ESRB: (T)een • Electronic Arts

www.ea.com/official/battlefield/2142/us

Welcome to future combat. Battlefield 2142 is to Battlefield 2 what Battlefield: Vietnam was to the original Battlefield 1942. 2142 goes beyond an expansion pack as a self-sustained title based on the Battlefield 2 engine. The premise of this latest Battlefield is that a new ice age has relegated the surviving population of Earth to limited land and resources along the equator. Understandably, these events have caused a dramatic change in the scope of the political frontier and the way war is waged.

Battlefield 2142 enters combat with its established FPS-style of gameplay with MMO underpinnings. It's at its best when you have friends playing in your squad against an enemy squad; random squads typically devolve quickly. The interface, weapons, and interaction will be familiar for anyone who played Battlefield 2, though the weapons are futuristic. However, many lack the heft of Battlefield 2's weapons.

The biggest new addition is the Titan mode, which can be played on any of the 48 available maps. Scattered around a map in the Titan mode are missile silos that teams will fight to control in order to fire missiles at the massive Titan ships floating overhead. You can transport to the ship in one of many cool ways after you drop its shields. Once on the enemy team's Titan, your team will work to place charges to destroy it. Playing in this mode with two coordinated teams is Battlefield 2142 nirvana.

We're not sure why character movement feels less responsive than Battlefield 2 when that game controlled so precisely. Fortunately, the vehicles in 2142 are still fun to get around in—we were partial to the battle walker (think Mech) and V/TOL gunships. As with past Battlefield titles, expect regularly additional developer patches to squash existing bugs and add functionality. ▲

CALL OF DUTY 3

Stunning Effects, But Less Epic Than The Last

-by Dr. Malaprop

$59.99 (360, PS3); $49.99 (Xbox, PS2, Wii)

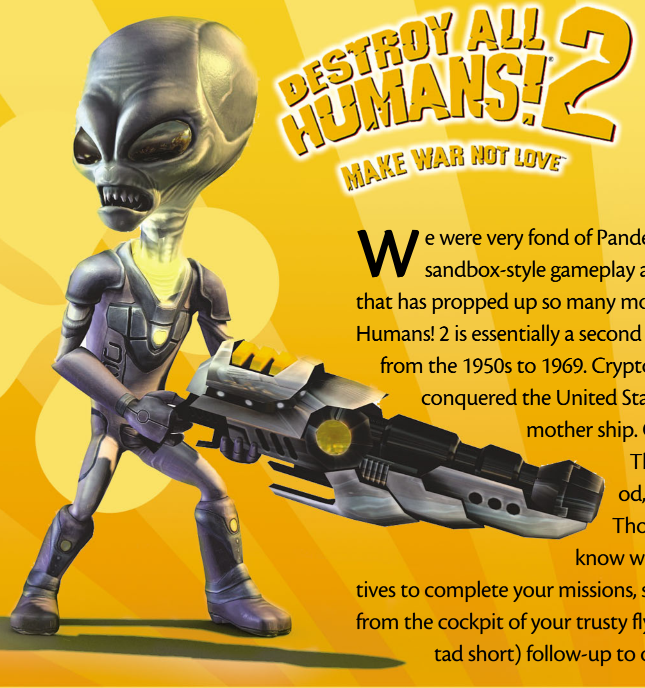
ESRB: (T)een • Activision

www.callofduty.com

First things first: Activision has chosen to not release CoD3 to PC gamers. This fantastic WWII-themed shooter series found stardom after its debut on the PC, so this news comes as travesty to PC gamers. Then again, console gamers won't be getting Crysis, will they? CoD2, which released in time for the Xbox 360 launch, combined intense World War II action, pretty graphics, balanced realism vs. playability, and an epic series of battles that wowed critics and console gamers alike.

Thus it was with great enthusiasm that we launched into CoD3. Graphically the game looks stunning and, with the exception of Gears of War, is undoubtedly the best-looking 360 title we've seen to date. Battling for less-famous landmarks as a Yank, Brit, Canuck, or Pole in Normandy is intense thanks to the scripted scenarios, but lacks CoD2's epic sense of scale. You're not going to recognize these battles without some research. The game's overall veneer is that of a highly polished product, but numerous AI and graphical glitches, on-rails gameplay, and overly narrow environments are a step backwards. The occasional melee events where you'll madly mash your paddles to fight off a Nazi are reminiscent of Sega's Shenmue. Thankfully they are kept to a minimum. A behind-the-scenes look at the game's development is revealing: Development duties were handed over to Treyarch because Infinity Ward (the series' original developer) immediately went to work on an as yet undisclosed project after completing CoD2. This transition and a rushed holiday release may be the cause for this less-than-perfect sequel.

What makes CoD3 more than a rental is its top-notch multiplayer Xbox Live experience. The game supports 12 players per side (with up to four players on a single console), seven character classes, vehicles, tight controls, wide-open maps, and six modes of gameplay. It's a blast to play. The single player looks stunning and is fun, but not on par with CoD2. However, if you really loved CoD2 on the 360, CoD3's single-player CoD3 experience will probably be quite satisfying. ▲

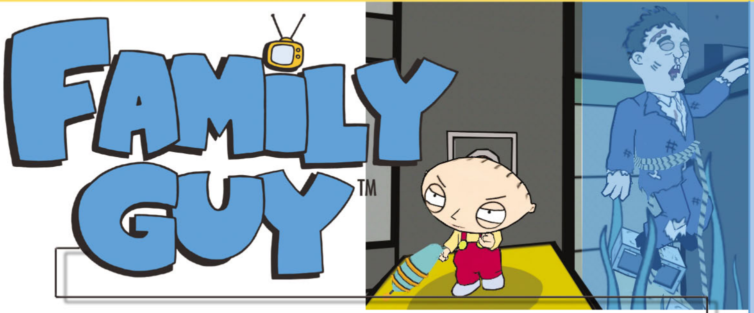


Cold-War Crypto *-by Chris Trumble*

$39.99 (Xbox, PS2) • ESRB: (T)een
THQ • www.destroyallhumansgame.com

We were very fond of Pandemic's first Destroy All Humans!, which was a fresh, new take on sandbox-style gameplay and an interesting twist on the age-old alien invasion theme that has propped up so many movies and games for the past several decades. Destroy All Humans! 2 is essentially a second helping of the same stuff, although the game shifts its focus from the 1950s to 1969. Crypto Sporidium 137, the first game's big-headed protagonist, has conquered the United States and is living the high life when a Russian nuke takes out his mother ship. Crypto sets out to even the score, and the game begins.

The flavor of the jokes has changed to reflect the new time period, and you get new guns and gear to freshen up the gameplay. Those changes aside, however, if you played the first game, you know what to expect from DAH!2. You'll need to meet certain objectives to complete your missions, some of which will involve causing mayhem on foot and others from the cockpit of your trusty flying saucer. Either way, you'll find DAH!2 an entertaining (if a tad short) follow-up to one of the PS2's most original and fun titles. ▲



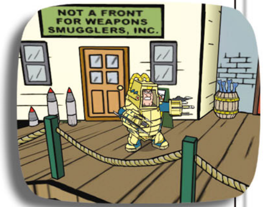
Come For The Laughs, Stay For The . . .Laughs

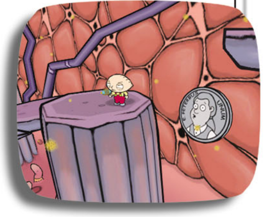
-by Chris Trumble

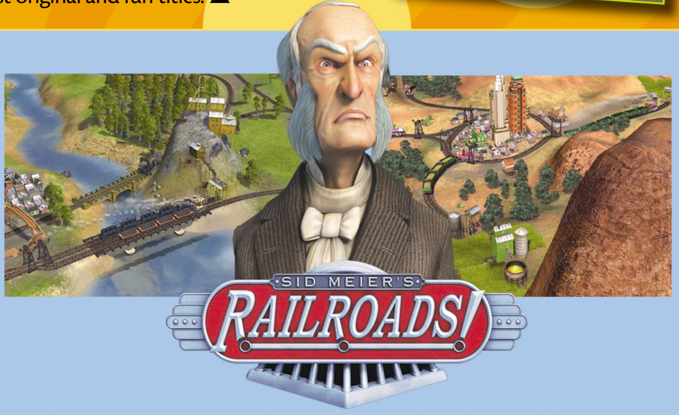
$29.99 (Xbox, PS2, PSP)
ESRB: (M)ature • 2K Games
www.2kgames.com

High Voltage and 2K Games designed the Family Guy videogame to play like an interactive Family Guy episode, an idea that worked OK in some ways but fell flat in others. We'll get the bad news out of the way first: The gameplay in Family Guy is pretty basic and gets old a little too fast. The game is split up into three main subgames and a number of minigames, but there's nothing here you haven't seen a thousand times. Peter's section of the affair plays a bit like Final Fight, Stewie stars in a platformer/shooter, and Brian's game is a stealth affair. The minigames you'll encounter break things up a little, but you'll find that you end up playing solely to get to the real meat of the game, which brings us to the good news: This game is pretty darned funny.

Fans of the show in particular or Seth MacFarlane's quirky brand of humor in general will find plenty of laughs here. MacFarlane and the rest of the show's cast took care of the voiceover work for the characters, and the TV series' writers were apparently involved in the process, as well. Not every gag works the way the game's creators probably hoped it would, but for the most part this is good stuff. Here's hoping the next time around we get gameplay that's as much fun as the one-liners. ▲







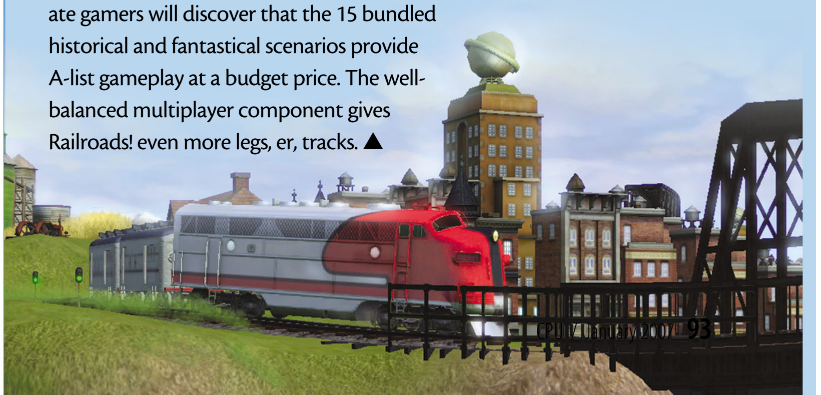
Back On The Chain Gang *-by Dr. Malaprop*

$39.99 • ESRB: (E)veryone • 2K Games • www.2kgames.com/railroads

It's been more than 15 years since Sid Meier published the original Railroad Tycoon DOS game through MicroProse Software. Our anticipation level on Sid Meier's Railroads! was flying high until we learned it was not a spiritual successor to the original. Sid Meier's Railroads! is not so much Railroad Tycoon IV, but Railroad Tycoon Ultra-Lite.

With windless sails, we set out to accomplish the primary goal: to build a great railroad business empire by building tracks between cities and supplying said cities with deliveries based on supply and demand (iron, coal, mail). You won't need a background in economics to succeed, and kudos to the game for making gameplay painless with a good tutorial, simplified interface, and easily understood stats/economy/communications. One obvious omission crops up as soon as you spend time laying tracks: There is no Undo function, which is an oversight for such a gamer-friendly design.

The game's graphics are attractive, but we noticed some graphical glitches and gameplay bugs that were rectified by patch 1.01. Novice and intermediate gamers will discover that the 15 bundled historical and fantastical scenarios provide A-list gameplay at a budget price. The well-balanced multiplayer component gives Railroads! even more legs, er, tracks. ▲



NEED FOR SPEED CARBON

Familiar Roads *-by Dr. Malaprop*

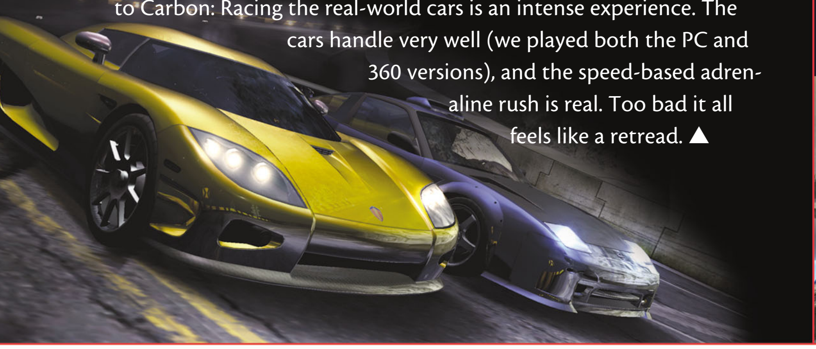
$59.95 (360, PS3); $49.95 (PS2, Wii); $39.95 (PC, Xbox, GC)

ESRB: (E)veryone • Electronic Arts • www.ea.com/nfs/carbon

The Need For Speed franchise debuted on 3DO back in 1994 and has had several iterations over the past 12 years. Unfortunately, Electronic Arts has been churning out new titles in the franchise on near-annual release schedules that feature light evolutionary upgrades and little innovation. That's unfortunate because despite Carbon's adrenaline-filled racing sequences, there's a feeling of having done all this before.

One new game mechanic introduced in Carbon is the use of wingmen. During a race you'll have access to an AI-controlled driver who you can command to take certain actions during races. Though the wingman concept sounds interesting, it ends up feeling like a rushed feature.

So far, things have been pretty negative, but there is a high point to Carbon: Racing the real-world cars is an intense experience. The cars handle very well (we played both the PC and 360 versions), and the speed-based adrenaline rush is real. Too bad it all feels like a retread. ▲



STAR WARS EMPIRE AT WAR FORCES OF CORRUPTION EXPANSION

Hang With The Wrong Crowd *-by Chris Trumble*

$29.99 (PC) • ESRB: (T)een • LucasArts • www.lucasarts.com

You've spent countless hours playing as the Empire and/or the Rebellion in Star Wars Empire at War; in the Forces of Corruption expansion (which requires the original Empire at War game), you get to play as a new third faction consisting entirely of underworld elements and profiteers. You know, scoundrels.

You play the game as criminal mastermind Tyber Zann, and as the title suggests, your main goal is to profit from the misfortune of both sides in the war for the galaxy. In order to do so, you must corrupt the galaxy, planet by planet. You'll engage in espionage, trade black-market goods and forbidden technologies, hound your enemies with guerilla attacks, and more. Jabba would be so proud. ▲

Logitech Z-10 Interactive Speaker System

Style Mated With Substance *-by Dr. Malaprop*

$149.99 (Windows XP/Vista PC)

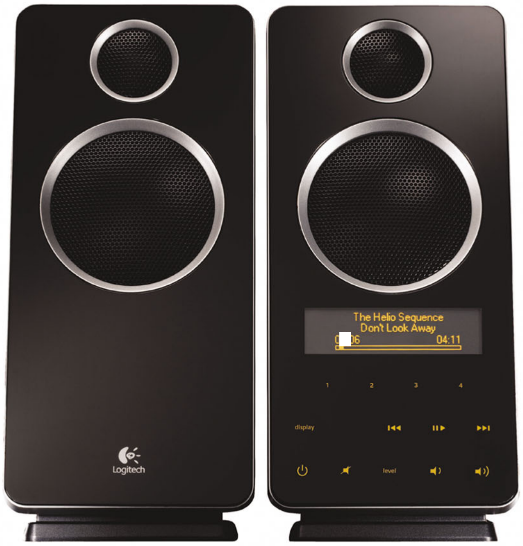
Logitech

www.logitech.com

CPU Rating: ●●●

It's not often we stray into the realm of 2.0 speakers, but Logitech's latest USB excursion caught our attention. Logitech's new Z-10 Interactive Speaker System succeeds admirably in its targeted scenarios. For example, it's not unusual to find a computer power user sporting two or more rigs side-by-side: one rig for gaming and a second for miscellaneous functions, including music playback. Another common scenario is having a PC located in a room where aesthetics matter. The Z-10s are ideal for that second PC or for a PC located somewhere where it needs to look nice.

Each speaker features black screens accentuated by silver trim covering the rounded ports that house a 1-inch dome tweeter and a 3-inch high-excursion subwoofer below, which allows for more linear travel (and improves bass) by the cone from its resting position. The large magnet in the lower port of each speaker lends further to the crisp bass sound. The built-in amplifier directs the appropriate sounds to the tweeter and subwoofer, which, according to Logitech, is more commonly seen in high-end, audiophile-friendly speakers.

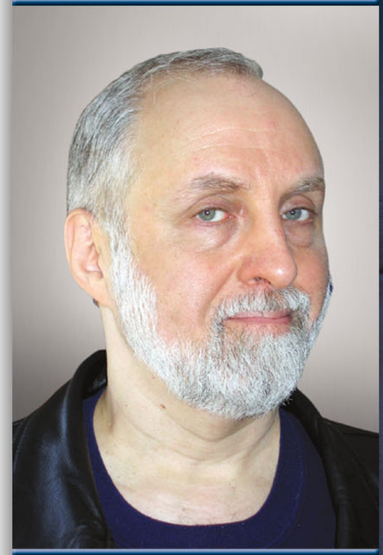


The right speaker includes touch-sensitive controls placed below an amber-on-black,160- x 43-pixel LCD display. The touch-sensitive controls include four numbered buttons placed below the display that can be programmed for Internet radio stations or playlists. Beneath that are controls for power, display modes, volume, track skip, play/pause, and mute. We tested Windows Media Center, WinAmp, and iTunes to queue up the tunes. We were able to control the music (skip tracks, change the volume, etc) without using the PC—a boon once your screen goes into power-save mode.

We threw rock, classical, bluegrass, and jazz at the Z-10s and they sounded great for speakers housed in compact 9.7- x 4.5- x 4.7-inch (HxWxD) enclosures. However, there are some caveats to this aural goodness: The speakers begin to lose fidelity when cranked up; however, we're talking levels at which aural discomfort ensues if you're in close proximity to them. As noted before, these speakers won't rock the house, but they certainly do rock your desktop in both performance and style. ▲

It's dBase, For All Your Database Needs!

by Barry Brenesal



Barry Brenesal has written more than 1,000 published articles and reviews on electronic technology since 1987. His first personal computer was a Radio Shack TRS-80 model 100. It was last seen functioning as a boat anchor.

I didn't lose my physical virginity to my wife, but I did lose my database virginity to her. It happened in the mid-1980s. I was frustrated over my inability to combine and analyze a variety of factors in numerous pieces of music—key signatures, phrase lengths, tuning systems, etc. This set her eyes sparkling. She immediately slid a diskette into her not-state-of-the-art Kaypro II, and the soothing amber-on-black screen displayed dBase. Several commands later, I had my data, along with more sorts and filters than you could shake a demisemiquaver at.

dBase was originally written in assembly language in 1978, by Wayne Ratliff. He was working at the NASA Jet Propulsion Laboratory in Pasadena at the time, and created the database for the lofty purpose of helping win the office football pool. The first name for the database program was Vulcan, in honor of a character from one of the worst television series ever envisioned by the mind of man. Vulcan had its forebears, most notably JPLDIS, the Jet Propulsion Laboratory Display Information System for UNIVAC mainframes. But where JPLDIS had several hundred fields, Vulcan used 16 and the CP/M operating system, as the idea was to scale it down for the requirements of personal computers. In October 1979, Ratliff ran his first Vulcan ad in BYTE Magazine and soon thereafter found himself with more business than he could manage. The fact that he was CEO, bookkeeper, marketer, and mailroom clerk may have had something to do with this.

Ratliff was seriously considering the sale of Vulcan when two businessmen, George Tate and Hal Lashlee, showed up. They had a very small business (read: one employee), and offered to take on all marketing and sales. Vulcan's name was changed to dBase II—not dBase, because the troika felt it sounded less finished. Thus Ashton-Tate was born, and a dastardly crime of deceptive marketing perpetrated that goes unpunished to this very day.

Without question, dBase was cutting-edge. With its runtime interpreter architecture, users could type in mnemonic commands, hit RETURN, and instantly see the results. It was easily customizable to a host of tasks and required no computer science degree for a little personal programming. Over time, the need for greater functionality would be met with an increasingly complex command set, but dBase never lost its core ease of use. Along with WordStar and VisiCalc, it was one of the mainstream applications in general use during the 1980s.

A famous early dBase guru was the late Tom Rettig, probably still best known for playing opposite Lassie in the first four seasons of a television show that took place in an unnaturally clean farmyard. Unlike most child actors, though, Rettig left the business as soon as his contract allowed. (I liked him best in that little-known but weirdly wonderful 1953 film, "The 5,000 Fingers of Dr. T," written by a then-unknown Dr. Seuss and co-starring the marvelous Hans Conried. Rent it sometime.) Rettig got involved with motivational speaking, but attempts to improve mailing lists led him into programming, and finally the offices of Ashton-Tate.

Rocky times hit the company when the self-driven, overworked George Tate died in 1984 at the age of 40. The company attempted to diversify its holdings after that, but Wang-based word processor MultiMate was purchased after its peak, while the integrated office suite Framework and desktop publisher Byline were never developed aggressively. Matters turned much worse when Roy Folk and Bill Stow churned out dBase IV in 1988, a terribly buggy, unstable product without a compiler (despite prerelease announcements that it would have one). Two years would pass before a 1.1 release that fixed many of its problems. In the meantime, sales plummeted. No work was done to improve dBase's handling of Windows, either, and the company finally merged with Borland in the early 1990s. dBase continued to live as it changed hands over the years, but its days as a market giant were over.

Still, if it hadn't been for dBase, I wouldn't have realized so soon that my wife was a mathhead, which is a great assist to a man that has trouble figuring out 15% restaurant tips. Of course, there was also the Celtic folk dancing, the long walks, and great sex, but my point is this: Ain't love grand? ▲

With its runtime interpreter architecture, users could type in mnemonic commands, hit RETURN, and instantly see the results.

Wax nostalgic with Barry at barry@cpumag.com

Software Tips & Projects

IE7: New Dog, New Tricks

After a long beta period, Internet Explorer 7 finally launched late last year, but how do you get things done in the new browser? We have some early tips that help get you up to speed and make the new IE feel more familiar than it looks.

Missing Menus

If you're looking for the familiar File/Edit/View/Favorites/Tools/Help menu bar, you can bring it back permanently by clicking the Tools tab and selecting Menu Bar. Or, to use the Menu Bar occasionally, simply press the ALT key, and it will pop up.

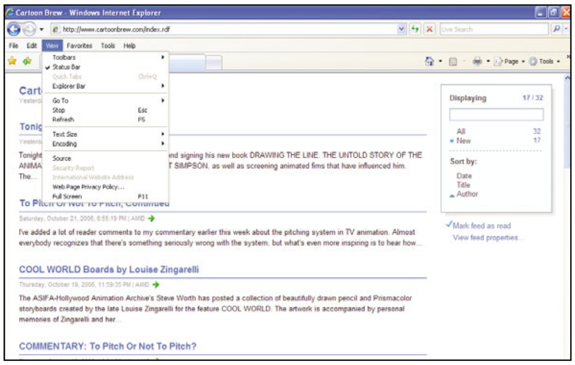
To change the position of the Menu Bar (sandwiched between the Address bar and tab bar), use this Registry tweak to make the Menu Bar appear above the Address bar: First, click Start and Run, type **regedit** in the Open field, and click OK. Next, go to HKEY_CURRENT_USER\SOFTWARE\MICROSOFT\INTERNET EXPLORER\TOOLBAR\WEBBROWSER. Right-click the WebBrowser key and then select New and DWORD Value. Next, name the value ITBar7Position. Double-click the new key, type **1** in the Value Data field, click OK, and relaunch IE7.

Shortcut Surfing

In IE7 you can create keyword shortcuts that the browser will recognize as you type them into the Address bar. First, type a URL in the Address bar and then press ENTER. When the site comes up, press CTRL-D to make it a Favorite. In order for this tip to work properly, you must keep this bookmark in the top level of your Favorites directory. The shortcuts won't work on sites you keep in subfolders. From now on, the Address bar will recognize the name you have assigned to this Favorite. You can also customize a Favorite's keyword by right-clicking it, selecting Properties from the drop-down menu, and clicking the General tab. Change the name in the top box to a simple tag such as "mail" or "weather." Click OK to save it and go back to the Address bar. Type in the new Favorite name, press ENTER, and the Address bar will bring you to the appropriate URL.

You can bring up any Favorite or any item in the Links bar with a keyboard shortcut. To do this, right-click the Favorite or link and select Properties from the drop-down menu. In the Web Document tab, type any letter or number in the Shortcut Key box. The box will attach your number or letter to a CTRL-ALT prefix to make a three-button-combo shortcut for that Favorite or link.

You still get many of the keyboard shortcuts from previous versions of IE with IE7, but some are specific only to IE7.



To Pitch Or Not To Pitch, Continued

Saturday, October 21, 2006, 6:55:10 PM | AMID

I've added a lot of reader comments to my commentary earlier this week about the pitching system in TV animation. Almost everybody recognizes that there's something seriously wrong with the system, but what's even more inspiring is to hear how...

COOL WORLD Boards by Louise Zingarelli

Thursday, October 19, 2006, 11:59:35 PM | AMID

The ASIFA-Hollywood Animation Archive's Steve Worth has posted a collection of beautifully drawn pencil and Prismacolor storyboards created by the late Louise Zingarelli for the feature COOL WORLD. The artwork is accompanied by personal memories of Zingarelli and her...

COMMENTARY: To Pitch Or Not To Pitch?

The familiar File/Edit/View/Favorites/Tools/Help menu is still available in Internet Explorer 7 if you press the ALT key.

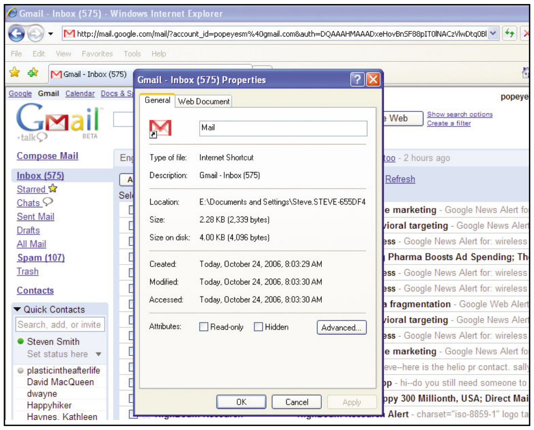
WinXP Tip Of The Month

You can create quick shutdown and reboot shortcuts for your Desktop or Quick Launch bar. Right-click your Desktop and select New and Shortcut. The Create Shortcut wizard will ask you for the location of the target program. For a straight shutdown key, type **shutdown -s -t 0** in the Type The Location Of The Item field and click the Next button. Give the shortcut a name and click Finish. For a reboot key, type **shutdown -r -t 0** in the Type The Location Of The Item field. You can drag these shortcuts into the Quick Launch bar, or you can give them cryptic names only you understand in order to use them with this month's Registry tweak.

Registry Tweak Of The Month

Sometimes you want to make sure that your computer runs continuously, especially if you have peer-to-peer file sharing programs such as BitTorrent or scheduled maintenance tools that are set to activate in the wee hours. This Registry tweak removes the Shutdown options from the Start menu and Task Manager so that others working on your PC can't easily shut it down. First, click Start and Run, type **regedit** in the Open field, and click OK. Next, go to HKEY_CURRENT_USER\SOFTWARE\MICROSOFT\WINDOWS\CURRENT VERSION\POLICIES\EXPLORER. If you don't see the NoClose value in the right pane, create it by right-clicking the Explorer key and selecting New and DWORD Value. Name the value NoClose and double-click it to set the Value Data to 1. Finally, reboot your computer.

- Open Favorites Center to Favorites list
  CTRL-I
- Open Favorites Center to RSS Feeds
  CTRL-J
- Open Favorites Center to History
  CTRL-H
- Open URL in new tab
  ALT-ENTER (from Address bar)
- Open Quick Tabs (tab previews)
  CTRL-Q
- Go to search box
  CTRL-E


Gmail - Inbox (575) Properties

Type of file: Internet Shortcut
Description: Gmail - Inbox (575)
Location: E:\Documents and Settings\Steve.STEVE-655DF4
Size: 2.28 KB (2,339 bytes)
Size on disk: 4.00 KB (4,096 bytes)
Created: Today, October 24, 2006, 8:03:29 AM
Modified: Today, October 24, 2006, 8:03:30 AM
Accessed: Today, October 24, 2006, 8:03:30 AM
Attributes: ☐ Read-only ☐ Hidden

Gmail - Inbox (575) - Windows Internet Explorer
http://mail.google.com/mail/?account_id=popeyesm%40gmail.com&auth=DQAAAHMAAADxeHovBnSF88pIT0lNACzVlwDtq0Bl
General
Web Document
Mail
Advanced...
OK
Cancel
Apply
Compose Mail
Inbox (575)
Starred
Chats
Sent Mail
Drafts
All Mail
Spam (107)
Trash
Contacts
Quick Contacts

You can assign keyword shortcuts to your top-level Favorites so that the Address bar recognizes a word such as "mail" and brings you directly to your Web mail URL.

Make Pop-Ups Into Tabs

To force pop-up windows to come up in tabs instead of new windows, click the Tools menu and select Internet Options. In the General tab click the Settings button under Tabs. Click the Always Open Pop-Ups In A New Tab button and then click OK to close out the windows.

You may notice that in this same Tab Browsing Settings window you can turn the tab feature off altogether by unchecking the Enable Tabbed Browsing box.

Save It All

In the past, saving Web pages as HTML files to your hard drive involved losing some elements in the page itself. IE7 does a better job of retaining more of the target Web page. Click the File menu and then select Save As. Click the Save As Type drop-down menu arrow to save the page in the Webpage, Complete (*.htm, *.html) format.

Feed The Feeds

Integrated RSS feeds are one of the most welcome additions to IE7. Oddly enough, Microsoft programmed these feeds by default to reach out for updated headlines once every 24 hours. For many of us who use RSS to monitor breaking news, this policy seems to defeat the purpose of feeds. To change the update frequency for a feed, press CTRL-J to open up your Feeds list. Right-click the feed you want to change the update frequency for and select Properties from the drop-down list. In the Feed Properties window, click Settings under Update Schedule and make sure the Automatically Check Feeds For Updates box is checked. Finally, click the Every drop-down menu to choose a frequency and click OK.

Firefox It

If you use Firefox, you're probably used to it letting you search for words or phrases on a Web page. You can get the same functionality from IE7 with a useful add-on called Inline Search. Click the Tools menu and select Manage Add-Ons and Find More Add-Ons. This brings up the Add-Ons catalog for IE. Type **inline** in the search box on that page and then download the Inline Search add-on. Now you can use CTRL-F to bring up a Find box at the bottom of the browser window and then search the page for words or phrases.

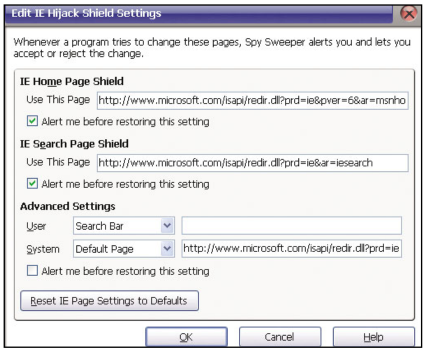
The Reset Button

You can back out of any changes you've made to the Toolbars, Add-Ons, ActiveX installations, and so on with IE7. Essentially, this well-buried option restores the browser to its original state, eliminating your stored passwords, any memory of browsing history, form data, etc. To do this, click the Tools menu and select Internet Options. Next, click the Advanced tab and then the Reset button. The system will issue a warning and outline what it will and will not delete during the restoration process. Your Favorites and RSS feeds will remain intact.

Can't Change The Home Page?

You may find that when you try to change the home page default in IE7, the browser's preset MSN home page keeps popping back whenever you restart. No, this isn't a nefarious plot by Microsoft to keep you on MSN. Your own antispyware protection probably is blocking the change. IE7 doesn't seem to workaround many of these security programs, so go into your spyware blocker and either turn off the feature that keeps others from hijacking your home page or set the home page you prefer from within the security program. CPU

by Steve Smith


Edit IE Hijack Shield Settings

Whenever a program tries to change these pages, Spy Sweeper alerts you and lets you accept or reject the change.

IE Home Page Shield
Use This Page http://www.microsoft.com/isapi/redir.dll?prd=ie&pver=6&ar=msnho
☑ Alert me before restoring this setting

IE Search Page Shield
Use This Page http://www.microsoft.com/isapi/redir.dll?prd=ie&ar=iesearch
☑ Alert me before restoring this setting

Advanced Settings
User Search Bar
System Default Page http://www.microsoft.com/isapi/redir.dll?prd=ie
☐ Alert me before restoring this setting

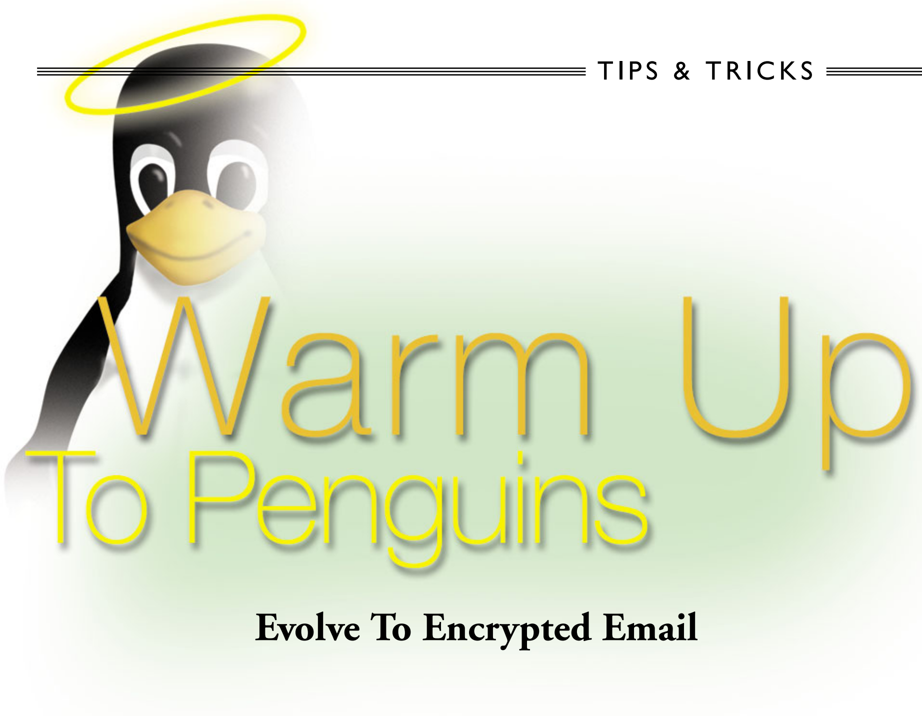
IE7 might not work with a third-party spyware blocker, which may keep you from permanently changing your launch home page.

Infinite Loop

ISIS Adventure Puzzle Ball

Looking for a little adventure in England? If you're willing to shell out about $190 for a puzzle, then you might consider the ISIS Adventure Puzzle Ball. This puzzle is constructed of layers covered in Egyptian hieroglyphics, and with millions of possible combinations, it may be nearly impossible to crack. If you do crack the code, you'll get a special key that will open an ISIS golden pyramid (hidden somewhere in the UK) filled with gold and silver coins (worth thousands of dollars). ▲

Source: www.gadgets.co.uk/item/ISIS1/ISIS-Adventure-Puzzle-Ball.html



Warm Up To Penguins

Evolve To Encrypted Email

To some people, going to the trouble of setting up encrypted email seems paranoid. For others, encrypted email is a vital feature. If you consider the fact that sending an unencrypted email is like sending a postcard—anyone who gets access to it can read it or even store copies—then it's easy to think of situations where it's smarter to at least put an envelope around that mail, so to speak.

A common tool for this purpose in the world of Linux is GPG, the GNU Privacy Guard (www.gnupg.org), the open-source and free software community's answer to PGP (Pretty Good Privacy). Obviously, your email client determines exactly how to enable GPG support. This article focuses on Novell Evolution and assumes that you are already a user of this software who simply wants to add the encryption feature to its capabilities.

Set Up Encryption Keys

In order to exchange GPG-encrypted email with others, you have to have your own pair of GPG keys. This pair consists of a public key, which you will share with others, and a private key that you will keep to yourself. You can then send and receive encrypted email to anyone whom you've given your public key; likewise, you'll be able to read someone else's encrypted email if you have his public key and added it to your "keyring." Acquiring your personal keys should be your first priority.

You may already be using GPG or another form of encryption to make SSH connections. However, the keys used for this process are auto-generated and strictly used for SSH. In order to encrypt your personal emails, you will need to create a key pair with a strong password. To start this process, open a command line terminal, type **gpg —gen-key**, and press ENTER. You will see the following output:

```
Please select what kind of key you want:
(1) DSA and Elgamal (default)
(2) DSA (sign only)
(5) RSA (sign only)
Your selection?
```

The default combination of DSA and Elgamal will work fine, as it provides a solid mixture of signing and encryption keys; press ENTER to select it. After you select the first option, you should see:

```
DSA keypair will have 1024 bits.
ELG-E keys may be between 1024 and 4096 bits long.
What keysize do you want? (2048)
```

The selected defaults give you the best bang for your buck for using your system's processing power to create and use the key compared to how long it would take a hacker's computer to crack the encryption. Although a longer encryption key translates into more secure emails, the average user can stick with the defaults with no worries. But if you're unsatisfied with the default number of bits for your key, type in a number that falls within the provided range and press ENTER.

Next, choose the length of time the key is valid. You can set a key to expire if you only intend to use it for a short while or make it permanent by specifying the default of 0. Note that if you do set an expiry time, you have to be careful to specify your desired length of time. Answering with only a number indicates that number of days; following the number with a "w," "m," or "y" specifies weeks, months, or years, respectively.

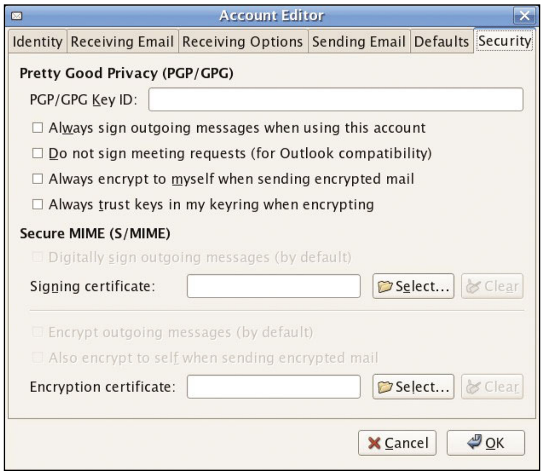
Once you've pressed ENTER, you are asked to confirm whether your entry is correct. After doing so GPG will help you set up a user ID for your key and display an example of what it wants. You will see the following text:

```
You need a user ID to identify your key; the software constructs the user ID from the Real Name, Comment, and Email Address in this form:
"Heinrich Heine (Der Dichter) <heinrichh@duesseldorf.de>"
Real name:
```

So, if you were the user mentioned in the example GPG displays, you would type **Heinrich Heine** in the Real name field and press ENTER. Next, at the prompt for your email address, provide the appropriate email address and press ENTER. The Comment field, which displays next, is where you enter the account's nickname (Der Dichter in the example); type in a nickname and press ENTER. Lastly, GPG will give you the chance to change any of these three fields before continuing. Type **O** and press ENTER to advance; you can also quit without creating the key by typing **Q** and pressing ENTER.

When GPG asks you for a passphrase, take note of the word "phrase." You can have spaces in your passphrase, and many people use sentences to make it harder to guess than a single word. But be forewarned that you won't be able to retrieve your passphrase if you can't remember it. You'll have to create a new keyset.

After reconfirming your passphrase, you will see characters start to appear on the screen. The program may ask you to



Pretty Good Privacy (PGP/GPG)

PGP/GPG Key ID:

☐ Always sign outgoing messages when using this account
☐ Do not sign meeting requests (for Outlook compatibility)
☐ Always encrypt to myself when sending encrypted mail
☐ Always trust keys in my keyring when encrypting

Secure MIME (S/MIME)

☐ Digitally sign outgoing messages (by default)

Signing certificate:

☐ Encrypt outgoing messages (by default)
☐ Also encrypt to self when sending encrypted mail

Encryption certificate:

Novell Evolution's Email Account Security tab lets you customize your encryption scheme.

"do some other work to give the OS a chance to collect more entropy!" To do so, literally do just about anything. You can type in the window itself, you can work on a word processing document, move your mouse, start a program—computers need help to get as close to real randomness as possible, otherwise their "random" choices can become too easy to predict and make the encryption too easy to break. You are using your unpredictable human nature to overcome your computer's predictable nature.

Expect the key generation process to take a few minutes. When it is complete, GPG will notify you that it has marked the key as "ultimately trusted" and created and signed your public/private keys. You now have a GPG key pair. To confirm, type **gpg —list-keys** and press ENTER. You will see information listed about your keys and any public keys you have added from other people.

Add Your Key To Evolution

To begin the process of adding your GPG key to Novell Evolution, click Edit and Preferences. With Mail Accounts selected, click the account you intend to use with your new keyset and click Edit. In the Account Editor dialog box, click the Security tab. Find your key ID and enter it in the PGP/GPG Key ID field. You can also type **gpg —list-keys** again to obtain your key ID.

After you attach your GPG keys to a particular account, Evolution gives you a number of options to further configure your account. We recommend the following setup:

- Check Always Sign Outgoing Messages When Using This Account if you want to "GPG sign" all emails you send in a way that verifies that they definitely came from you. Checking this option won't encrypt the messages, however.
- Check Do Not Sign Meeting Requests (For Outlook Compatibility) if you are using Evolution/Outlook integration for handling meeting calendars; the signature may cause problems with Outlook.
- Check Always Encrypt To Myself When Sending Encrypted Mail. It's an intelligent option if you know someone has access to your Sent folder. If anyone tries to look through the folder, she can't read the mail without knowing your passphrase.
- Check Always Trust Keys In My Keyring When Encrypting if you don't want Evolution to bother you with verification questions when sending out email.

Send Encrypted Mail

If you don't have a particular recipient's public key, then you won't be able to send them an encrypted email. There are a number of ways to get this key, such as copying it out of the bottom of an email when someone includes it in her signature. If you receive a key in a file, save it to a text file. Then, in a command line terminal, type **gpg** ***file*** (such as **gpg newkey**) to import it to your keyring.

You can also download public keys from key servers. Before you import a particular person's key, he must upload his key ID to the server. (One popular server is wwwkeys.pgp.net.) To import a key ID, type **gpg —recv-keys —keyserver wwwkeys.pgp.net** ***keyid*** (replace *keyid* with the key ID you want) to load the key.

Now that you've loaded your key and your recipients' keys, you can start sending encrypted emails by opening a new email and clicking the Security menu. To just sign a message, click Security and PGP Sign. If you want to encrypt the mail, click Security and PGP Encrypt. Congratulations, you now have the option to send your email in a format more secure than a postcard. CPU

by Dee-Ann LeBlanc

Infinite Loop

The World's Smartest Coffee Pot

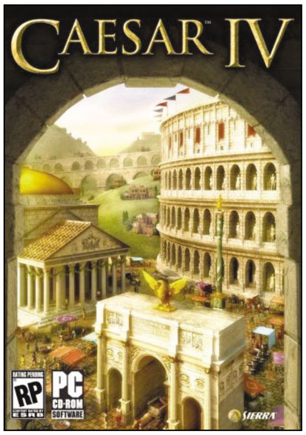
It probably won't be challenging Gary Kasparov to a chess match anytime soon, but the Smart Mill & Brew comes equipped with Microsoft's SPOT (Smart Personal Objects Technology) and .NET framework. In addition to serving up your favorite French roast, the Smart Mill & Brew connects to MSN Direct to deliver a daily forecast. Styrofoam cups not included. ▲

Shavings From The Rumour Mill

Hail Caesar! Is It Snowing Outside?

by Mike Magee

Your non-Vista-equipped British columnist was so happy that Caesar IV was released, he forgot all about the delays to Duke Nukem and installed it on his soon-to-be very ancient and obsolete desktop PC.



Hail Caesar!

The Readme.txt says the game isn't designed for Microsoft Vista, but it does need a top-end graphics card to display all the effects it offers, including snow, thunder, and rain (as yet I haven't encountered hail).

The game's designers have done really, really well with the upgrade from Caesar III, I have to note. They have included lower and middle classes along with the patricians in the game, but let me tell you, if you're into this game, you'd better make sure you have an Nvidia board of the highest echelon, because this game is designed for the upper class in that regard.

I write this column just as Microsoft Vista is "released to manufacturing," and the consumer version of Vista for the plebs, or consumers as the software firm has it, won't be out until the end of January 2007.

This led me to ponder over many matters like the latter-day Cassandra I am. Has Microsoft consulted the games makers about its Vista plans? Has it talked to Nvidia about the bonus Vista will give games players? Are the memory makers still wondering what the best configuration will be to run Vista Premium? Is Microsoft even talking to Intel anymore? And where does that leave us poor plebs in the year of grace 2007?

Answers on a postcard follow: Yes, Microsoft has talked to games developers, but it doesn't need to tell them everything. And yes, Microsoft has bored Nvidia to tears for the last three years about how good Vista will be. No, the memory makers are already raising prices because of what they hope will be a Vista bonanza. Yes, occasionally Microsoft will talk to Intel, but it mistrusts the semiconductor manufacturer less than ever, given the endless rumors that the mighty Chipzilla has its own open-source operating system with GUI in reserve.

The answer to the last question is that we plebs who buy PCs are still caught in the smoke and mirrors generated by the vendors.

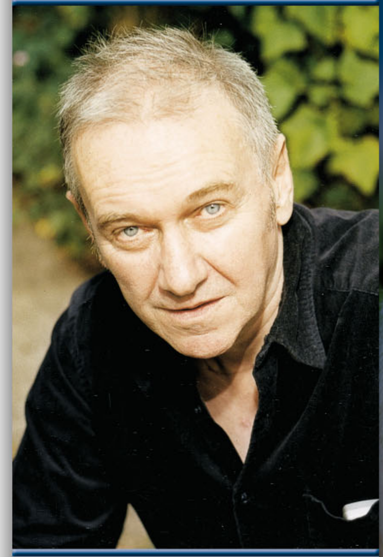
While, apparently, Microsoft Vista is great, some will wait awhile before we jump, because the industry is in a state of such indecision that spending an additional $4,000 to have a state-of-the-art machine might make us wonder why we've spent that much hard-earned cash.

I still have this tiny sliver of resentment burning in my heart because Caesar IV isn't quite as playable on my very serviceable ATI-AMD card as it might be on an Nvidia card. I can't see myself going out and spending loads of dollars on an Nvidia graphics card that will play Caesar IV very well but still might not be enough to show Vista Premium in its best light without buying oodles of "special" memory.

I am certainly not going to destabilize a very serviceable PC just for the sake of running Caesar IV or—and it is an "or"—Microsoft Vista.

You know what? I might just wait until September or October 2007 and buy a new machine then, when the dust has settled. This may make me sound a bit like a soothsayer of doom, but after installing every Windows OS since the very first, I'm just ultra-cautious. Once bitten, twice shy, but when you've been bitten five times by Windows as I have, the correct coinage of the realm is that you can't teach old dogs new tricks. ▲

Send rumours to "Mad Mike" Magee at mike@cpumag.com.



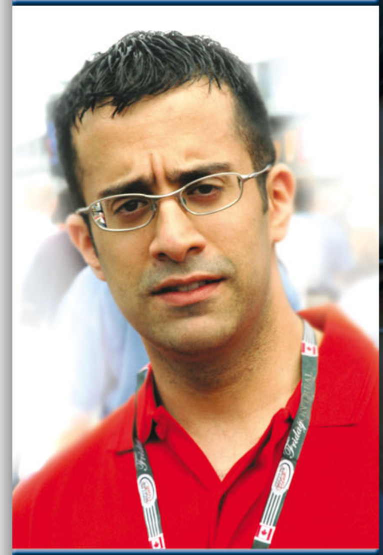
Mike Magee is an industry veteran. He cut his teeth on ancient products like the Dragon and the Japanese PC platforms long before the IBM-PC won. He worked for a corporate reseller in the mid-'80s and saw the Compaq 386 sandwich box and every GUI known to humankind. Mike decided that the way to go was the Interweb around 1994 after editing PC mags in the late '80s and '90s. A co-founder of The Register, Mike started the chip-driven INQUIRER (www.theinquirer.net) in 2001. He has contacts from top to bottom in the business, spanning the entire chain, who help him root out interesting rumours and speculation.

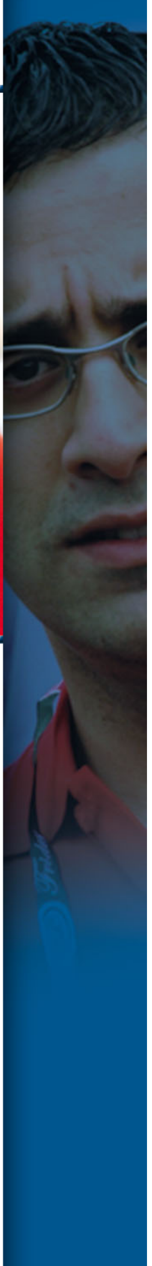
> . . . let me tell you, if you're into this game, you'd better make sure you have an Nvidia board of the highest echelon . . .

Wagging The Dog

by Rahul Sood

What, Me Manipulate *You?*





Rahul Sood's love for computers started at the young age of 11. Much to the shock and dismay of his parents, he ripped apart his brand-new Apple //c and painted it red before turning it on. His parent's dreams of having a doctor for a son were shattered when college drop-out Rahul founded what is now one of the most respected high-end computer companies in the world, Voodoo Computers.

Sometime in early 2005 we at Voodoo made some changes in the way we interacted with our suppliers, our customers, and the media. For years, enthusiast companies have been used by the much larger hardware manufacturers to help sell their products to mainstream customers; ask anyone in the channel and they'll tell you it's absolutely true.

This is how it works: The big guys come up with a new piece of hardware, then they work with the enthusiasts to get the hardware in system reviews immediately because they know damn well that review wins equate to a profound halo effect. The enthusiasts generally play ball and do whatever it takes to put out a review machine at any cost, despite the inherent performance and stability risks. The review comes out, and hopefully it's a good one, leading to the mainstream reader saying, "Wow! If XY Enthusiast Company uses this hardware in their machine and it got this great review, that must mean that ZZ Hardware Company is the best!"

It makes sense, after all the halo effect is incredibly powerful guerrilla marketing. The problem isn't in the concept; it's in the execution, which requires manipulation and sometimes deception to the highest degree: manipulation of the media by trying to justify certain launch dates, and manipulation of the enthusiast company to ensure that it gets the review units out just in time. The biggest loser in this is the customer, who usually ends up waiting months to get a system because the hardware that was promised to us ends up being "over-allocated" and doesn't really hit its launch date. Granted, sometimes delays are unavoidable, and we make it clear to our customers that certain hardware may cause delays in their order.

Since HP acquired Voodoo, we've been getting calls from almost everyone under the sun, including a company who has had years of trouble trying to launch *one* product. Finally, this company has an accessory that it is trying to get us to buy and our contact can't even supply a sample (we're talking about a $200-on-a-bad-day accessory). Our rep claims that we first have to commit to a specific order quantity because his company "cannot keep them in stock." Needless to say, I "filed" that email.

Sometime last year we were approached by a new hardware vendor who was interested in having Voodoo "launch" its new technology to the gaming market. Our incentive: Voodoo would be one of a handful of companies listed on the company's Web site and mentioned in its advertising. In looking at the hardware we realized that it wasn't yet ready to launch, we humbly declined the vendor's offer. Others jumped on board, and in the end they ended up selling hardware to their customers that wasn't fully baked.

And then there's the time a team of executives from a certain supplier told us about an upcoming platform that we should really consider selling to gamers. We got the full PowerPoint presentation, we were wined and dined, and the next day our suitors asked if we would be interested in launching it. The funny thing was we didn't get to see the product. They wanted us to start taking preorders on it without even seeing it! Are you kidding me? That's like an 11 on the Ludicrous Requests Scale of one to 10. It's unfortunate, but that's almost the level of insanity that we've reached in the industry. Thankfully, no one took the bait.

So who are the guilty ones? Almost everyone is guilty of some form of paper launching at one point or another. It's a symptom of the unhealthy, cutthroat competition that we as an industry need to get away from, whatever it takes. As for Voodoo, we are not puppets; we will not launch something unless we know it's fully baked—we hate paper launches as much as you do. ▲

The problem isn't in the concept; it's in the execution, which requires manipulation and sometimes deception to the highest degree . . .

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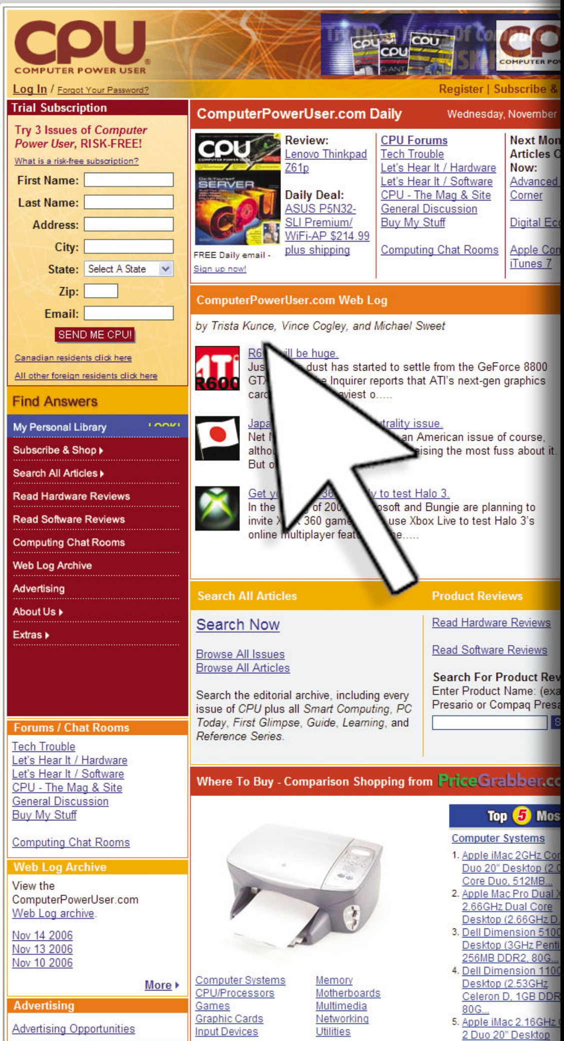

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Technically Speaking

An Interview With Joe Wilcox, Senior Analyst For JupiterResearch

Joe Wilcox is a senior analyst for JupiterResearch, a prominent market research and analysis firm in New York City. He also anchors the company's Microsoft service, which provides tactical analysis to companies that compete or partner with Microsoft.

by Barry Brenesal

CPU: JupiterResearch recently did a survey that included questions about Vista. Could you tell us a little bit about that?

Wilson: Among other questions, we asked businesses about their intentions to deploy Windows Vista and also Office 2007. The idea was to get a sense of what they were planning to do whenever Microsoft released the operating system and productivity suite. We asked a little over 300 businesses with one to 10,000-plus employees.

CPU: What were some of the conclusions you drew from the results?

Wilson: Basically, while some businesses will begin—with an emphasis on begin—deploying Windows Vista within the first 12 months, we expect a protracted period of deployment. And don't expect the other Windows operating systems to be significantly displaced for seven years or more.

CPU: I read online that this survey showed more than 20% of businesses didn't have any plans to upgrade to Vista.

Wilson: That is for businesses with 100 or more employees. They are different-sized businesses, and they do things a little differently. Another 30% said they would upgrade in more than a year, and half of those expected to deploy within 24 months.

CPU: And if Microsoft manages to get Vista out in 2007, then businesses still have to look at their financial cycles, which aren't always January/December.

Wilson: Right, but still it's more than just that. Generally businesses tend to standardize on an operating system for as long as possible. What I expect to see happen is businesses will buy Vista PCs, wipe their hard drives, and put on WinXP—because that's what they're standardized on. That'll change many years from now, but not anytime soon.

CPU: Will that inertia also be due, in part, to a fear of change under the new operating system?

Wilson: They don't want change. Change causes disruption. With respect to IT, many businesses tend to be very risk-adverse because when they introduce something new, support calls can rise, employees become confused, and things may go wrong during the training. All of those problems added together can cost a company money, so they standardize for as long as they can. They know that while there are many benefits around manageability and security in Vista, there are also potential hardships. Microsoft has made some dramatic changes to the user interface. It's introduced new security pop-ups. These things are potentially useful down the road, but if you're talking about making the actual switch, they're potential inhibitors.

CPU: How far down the line do you see Vista being a success for Microsoft?

Wilson: Microsoft will have good numbers right away because when consumers go out to buy new PCs, Vista will be on them. If they call Dell, they're going to get Windows Vista. If they're small businesses and go to Office Depot or Best Buy, they're going to get Windows Vista. Those larger businesses that buy new PCs—even those that don't deploy Vista—what's going to be on those PCs that they buy? Windows Vista. If Microsoft counts all of these and license sales, they will have great numbers and can say, 'Vista is a success because we sold X number of licenses.' The caveat is that just because the license is purchased, doesn't mean that it's used, at least when we're talking about large businesses.

CPU: In terms of actual usage of Vista, how many years down the road before it becomes the equivalent of a success?

Wilson: It's going to take a while. WinXP is a great operating system, and for many people it's going to be good enough. It's going to take time for the transition and some aggressive marketing on the part of Microsoft to communicate the benefits, telling businesses and consumers why XP isn't good enough and why they should buy Vista. For some people the message will resonate. For many others it will not.

CPU: You stated earlier that the businesses that were putting off plans to upgrade quickly to Vista were organizations of 100 or more employees. What about the groups under 100?

Wilson: We expect the adoption among smaller businesses to be much faster than larger businesses for a number of reasons: One is a purchase difference. Smaller businesses tend to lack a certain IT expertise. They also don't have the burden of infrastructure that a larger business carries. It's a lot easier to move 10 people to a new platform than 10,000. So our expectations are that smaller businesses, especially those between 10 and 49 employees, will make the move at a faster clip.

> Microsoft will have good numbers right away because when consumers go out to buy new PCs, Vista will be on them.
>
> —Joe Wilcox

CPU: Microsoft has portrayed itself as innovative over the years, but critics have responded that it doesn't innovate, it buys—both companies and their technologies. Where does the truth lie in your opinion?

Wilson: A lot of it depends on how you define 'innovation.' Does it mean coming up with something new, or does it mean taking something and making it better? I would say the latter probably applies to Microsoft. Certainly Microsoft has a lot of original ideas, but a lot of its successes really come from following someone else and improving what they had.

The company's at a crucial juncture in its history. It's at a place it's been before (the Web situation), only it looks a lot more threatening than it did before.

CPU: How do you mean?

Wilson: Back in 1995 Bill Gates issued his famous 'Internet Memo' and Microsoft launched upon the browser wars. I disagree with a lot of people that saw Netscape as its target. I think Microsoft's target was the Web itself. Microsoft wanted to retain the relevance of Windows, and the way that it chose to do that was to make the browser a part of the operating system so that Windows would be required to access the Internet.

Now we fast-forward 10 years, and we see dramatic things happening in part because of the success Google has had showing you can make money on the Web: the so-called Web 2.0 situation. There's no question that it could change the relevancy of desktop software as we know it. If you look at Google and what it's doing, or some of the Web 2.0 companies, they don't directly compete with Microsoft. Yet everything they do competes with Microsoft on the desktop. That's because as people move to the browser, they're finding that they have information available in more ways than they did before. It's about accessing information anytime, anywhere, on anything. That's part of the promise with where we are with Web 2.0, which I've sometimes called the 'Web Threat 2.0.'

CPU: How do you think Microsoft should meet this threat?

Wilson: There are two ways Microsoft can go. The approach they'll probably take is to try and maintain the relevancy of desktop software as we know it by taking more of a hybrid approach. A good example of that is beta software Microsoft released about a month ago called Windows Live Writer. It's actually blogging software that you run on your desktop. My first reaction was, 'Well, why do you need that?' Most blogging services provide very good utilities for writing on their service. So why is Microsoft doing this? Because they want to shift the relevancy back to the desktop. Microsoft has a number of other applications with which it's pursuing a similar approach.

What I think Microsoft would be better off doing is looking at server opportunities and exploiting those. Microsoft's server software business is a big growth business right now, compared to Office and Windows. And all this Web stuff, where is it going to come from? It's going to come from servers. It isn't like software is out of the equation. Microsoft really should be thinking about how its server software can be positioned technologically from a marketing perspective as the best for delivering anything on the Web. What Microsoft can do is, as the relevancy shifts somewhere else, rather than hold tightly onto its desktop hegemony shift with the relevancy. I think that if Microsoft does that, it will succeed handily in this changing environment.

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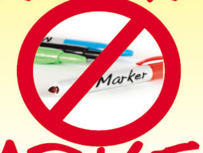

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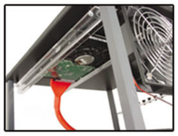

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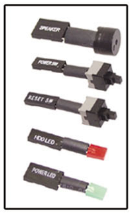

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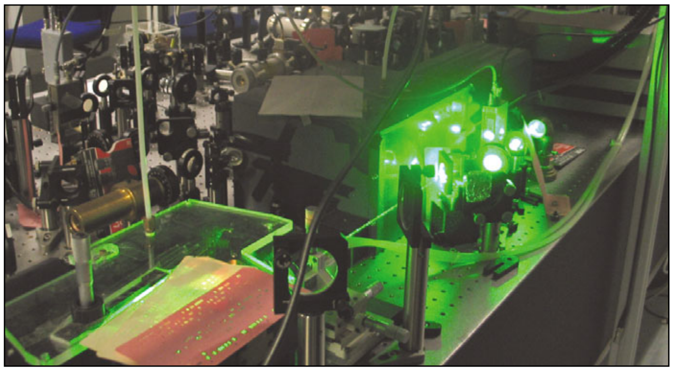
by Kristina Spencer

Under Development

A Peek At What's Brewing In The Laboratory

Teleportation Makes A Quantum Leap



Teleporting humans *à la* "Star Trek" is still only possible in the world of science fiction. But at the Niels Bohr Institute in Copenhagen, Denmark, scientists have gone where no one has gone before by successfully teleporting quantum information from light to matter over a distance of more than half a meter. Previously, researchers had only been able to demonstrate quantum teleportation over very short distances (less than five micrometers) and between like natures—light-to-light and matter-to-matter.

"This represents a significant step toward the implementation of a distributed quantum network in which quantum information can be exchanged to perform quantum computations or for [a] completely secure transfer of secret information," say Hanna Krauter and Jacob Sherson, graduate students and members of the team led by Professor Eugene Polzik.

To accomplish quantum teleportation, the team entangles quantum information with one of two already entangled particles. The two entangled particles are perfectly synchronized, even when physical distance separates them. Thus, when information is entangled with one of these particles, the group takes a measurement of the information (in this case, a light pulse's intensity and phase) and transmits it to the other particle via a classical transportation route, such as light or electricity. Then, the other particle completes the teleportation and produces that information by comparing the two states and deciphering what information has been added.

In the NBI experiment, the research team entangled a light pulse with caesium gas atoms. The team then entangled a different light pulse's quantum states of amplitude and phase and teleported it back to the caesium gas' atomic structure.

"This link is important," notes Krauter, "because light is intrinsically an excellent carrier of information (classical as well as quantum), whereas an atomic medium is ideal for [long-term] storage of such information."

Although the experiment's results don't help those of us wishing to be beamed to work and back as a way of reducing commute time, it's a breakthrough in the development of quantum computing and cryptography. The team's next research steps include reversing the experiment by transferring quantum information from matter to light and using its approach to increase the distance over which the teleportation of an atomic state on to another atomic medium can occur.

For more information on quantum teleportation, see page 46 of the February 2005 *CPU*. ▲

Morphing Structures Lock & Roll

Researchers at the University of Cambridge have created a series of metal structures that are capable of seamlessly transforming from one shape to another without any hinges, latches, or locks. Known as "morphing structures," these solids may be the key to developing computer displays and other electronics that can roll up to tuck into a briefcase or backpack.

The morphing objects, developed by Dr. Keith Seffen from the Department of Engineering's Structures Group, are manufactured with a preprogrammed structural memory of the shapes they can assume (in some cases through a patterned dimpling of the metal surface). When enough force is applied to one of the structures and the internal stress approaches a breaking point, the object assumes one of its other shapes; each has at least two and can have up to three. They function much like toy snap bracelets that can go from a flat piece of metal to a curved one with a simple flick. Seffen and his colleagues have applied to patent the technology.

The structures are stable and rigid in each of their forms, yet light and thin. "They offer substantial shape-changing capabilities [while] preserving structural integrity," notes Seffen in a Cambridge press release. "They are simply made, and their operation does not rely upon advanced materials. They afford compact, inexpensive solutions for multifunctional devices, which are required to be lightweight, stiff, but foldable-on-demand."

The research group has only demonstrated the structures made from copper alloys, but Seffen's group is looking to collaborate with manufacturers of flexible electronics to apply their research to plastics and other materials that can support flexible circuits. The technology promises potential applications that include reusable packing, self-erecting temporary habitats, portable electronics, and roll-up keyboards. ▲

A Unique Way To Secure Wi-Fi Networks

Security systems based on biometrics have become a hot area of research over the past few years. Humans have a number of unique characteristics, including our fingertips, retinas, voice, and more, that can be used as a basis for virtually foolproof identification. Now, researchers at Carleton University are applying the same principles to create a new way of securing Wi-Fi networks from attacks by rogue devices.

The system, which Carleton graduate student Dr. Jeyanthi Hall is currently developing, relies on the fact that wireless transceivers, though mass-produced and designed to function within a certain level of tolerances, are each slightly different due to variations in their components, such as their silicon. These variances create a unique RF fingerprint for each transceiver that can identify the device.

When a device attempts to gain access to a wireless network, it creates a transient signal, and it is those signals that Hall's system uses to create the "transceiverprint," both because the variances are most obvious in that part of the signal, and it can be done quickly—within two microseconds. After the system acquires the RF fingerprint, it compares the fingerprint to a list of those already cleared to use the system. If it matches, the sytem grants the device in question permission to join the network.

Hall's system could complement more traditional network security measures, such as data encryption, password protection, and MAC address control lists. Because it identifies devices based on characteristics specific to the actual hardware, unauthorized attempts to gain network access by means such as impersonating an authorized user or MAC address spoofing are unlikely to be successful as long as the device itself has not been stolen.

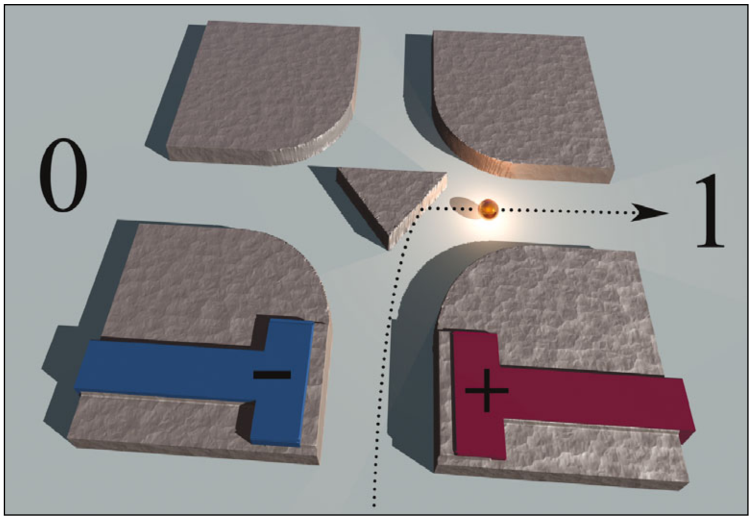
In tests, the system produced a 93% detection rate of unauthorized access attempts with only a 5% false alarm rate. The research team believes it can increase these rates by optimizing the validation algorithm and including more transceiver profiles from each manufacturer to better differentiate them from one another. ▲

Computer Chips Go Ballistic

In order to solve a problem, sometimes you need to throw out the old ideas and try a radically different solution, which is exactly what researchers at the University of Rochester are doing. Rather than trying to modify existing transistor designs to delay the death of Moore's Law, they came up with an entirely new paradigm that could someday lead to blazing fast speed without the blazing heat conventional chips create.

Although traditional transistors rely on the presence or absence of electrons to register 1s and 0s, the BDT (Ballistic Deflection Transistor) uses a triangular deflector to bounce electrons fired at it in one direction or another. When the electrons reach the deflector, an electrical field pushes it either to the left or to the right, registering a 0 or 1, respectively.

Because the BDT doesn't stop and start the flow of electrons to process information, it consumes less energy, gives off less heat, and is a great deal faster than today's chips. The team believes the technology could eventually produce chips with speeds of up to 3THz—more than a thousand times speedier than chips produced today—while generating only a few microwatts of heat per transistor.



The radical design offers a lot of promise but also presents unique hurdles. "The technical challenges have been many," says Quentin Diduck, the Rochester graduate student who came up with the idea for the BDT. "When you start talking about the physics we are using, it's basically all new. There are assorted problems with the physics not being well-defined or completely understood.

Even now, people are working on a complete quantum mechanical understanding of the deflective structure; it's not as easy as one might think."

Diduck refers to the BDT as "beyond CMOS" technology and believes that it will take five to 10 years for BDTs to complement or replace conventional transistors in computer processors. But he thinks the technology could make its way into other applications much sooner than that.

"The thing to expect first are small digital circuits that require the performance that this transistor will provide," says Diduck. "I can potentially see applications in telecom within three years. They will most likely be the early adopters." ▲

Q&A With Ted Hoff

Not many people can claim to have changed the world like Ted Hoff did in November 1971. Hoff is the co-inventor of Intel's first microprocessor, the 4004. He was the architect of a chip that was first destined for a calculator made by Busicom. Busicom's engineers had proposed a complicated custom chip, but Hoff figured a general purpose microprocessor—a computer on a single chip—would do the job better. Together with engineers Stan Mazor and Federico Faggin, Hoff helped spark the revolution in microprocessors that fueled the age of information. Now there are billions of processors manufactured every year for everything from dual-core gamer PCs to control systems in automobiles. At 69 and retired from Intel, Hoff is amazed at how far CPUs have come. Lately Hoff's been serving as a patent and legal consultant and even has his own collection of 50,000 chips. As of recently, Hoff appears in "The Microprocessor Chronicles," an oral history video by Rob Walker that aims to capture the creation of the microprocessor and its aftermath.

Q **Why did you choose to participate in a video about the invention of the microprocessor?**

TH There is a tendency to forget or ignore history, so it seems to me desirable to tell the story, and Rob seemed to be doing a comprehensive job at it. The tendency in the media has been to talk to one or two people and then just present that. He [Rob] was talking to a lot of people. There is a lot of effort that it took to launch the microprocessor as a full-blown business.

Q **After developing a new product or industry, can a company still learn certain lessons about marketing it?**

TH I think there are still lessons to be learned. One of the more recent experiences was the whole dot-com bubble and its bursting. It seemed to me to be partly caused by people ignoring the view that businesses are set up to be profitable enterprises. You can have fun with technology, but you also have to have a way to make money at it.

Q **The microprocessor definitely has an interesting history, so what surprises you about its past, present, or future?**

TH When you talk about surprises, one is the whole view of Moore's Law: It has lasted this long. Back in the early days, I don't think anybody thought it would be possible for it to go on for so long. We've had exponential growth for more than 40 years. Now there's a debate going on about it. We know that it has to eventually slow down and end. You can't make things smaller than atomic dimensions. It's unclear how far you can go in physical size. There's a debate with some people saying it's already dead and others saying it has decades to go.

Q **Did the microprocessor industry evolve the way you thought it would?**

TH Our original view when we first launched the microprocessor was that embedded control would be the market. There has been an amazing amount of progress that has helped the desktop and notebook computer markets. When you think of the computing power you carry under your arms and how it exceeds what would have filled a building a few decades ago, that's amazing.

Q **Tell us about your collection of chips.**

TH I have a number of ways of picking up old chips. We have a lot of surplus stores in the area and electronic flea markets. I probably have about 50,000 integrated circuits in my workshop. There are probably 20,000 or so that are in the tubes in foam board; others are on circuit boards that I have catalogued. If I am looking for a part, I know where to go. I pop it off when I need it. I'm always building little projects; some to amuse my grandchildren and some for my own amusement.

Q **Do you still have a working 4004?**

TH I have a working 4004. I have a unit I have not done much with. Around 1972, we developed a little demonstrator to show how a 4004 could be used to put the image of a rocket ship up on a television screen. We programmed it. Another chip in the family did what was called a transform. We put the image of a ship and we could rotate it. We were never successful in persuading the video game companies in 1972 that they should go with a microprocessor. It took a few years before that happened. I still have that in my shop, but I haven't fired it up in a few years. ▲

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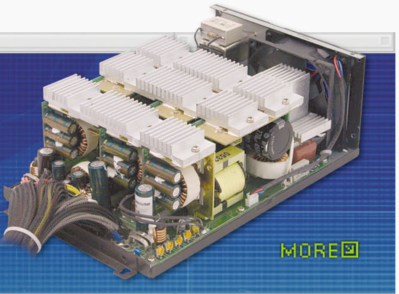

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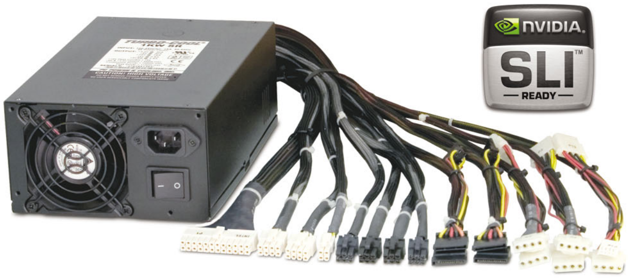

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